

Figure 1 - Process Control System

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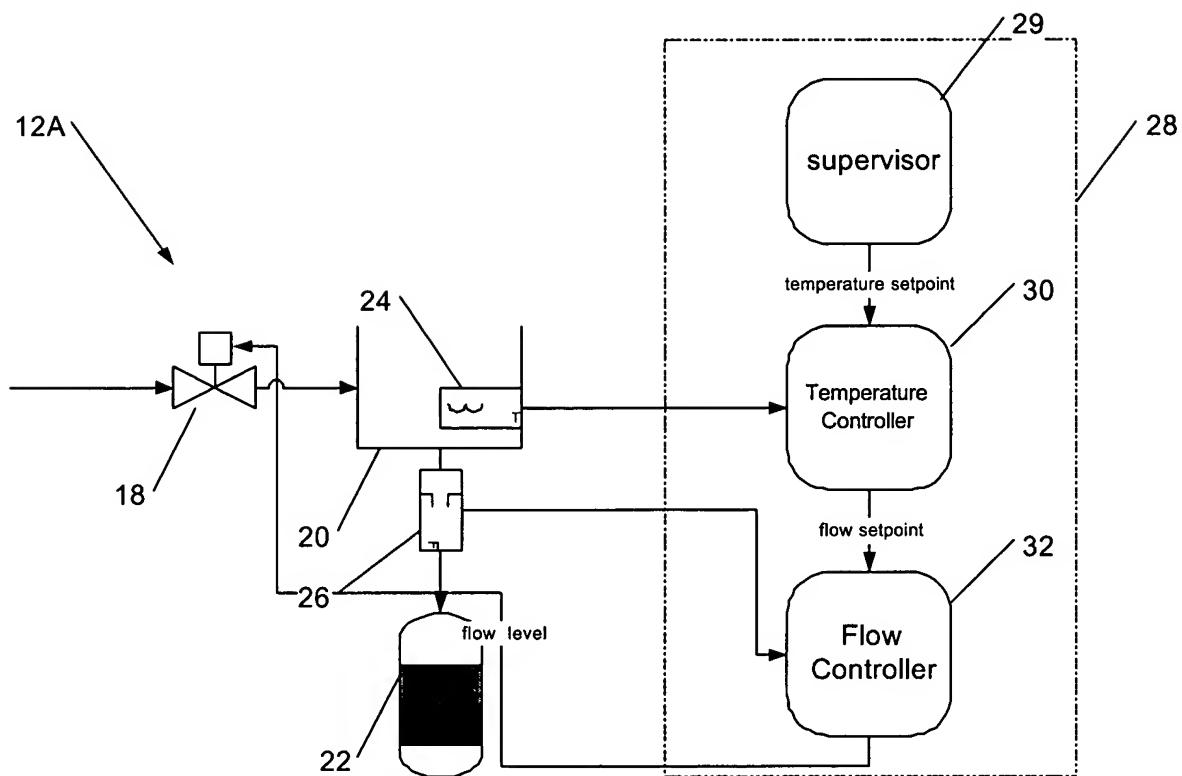


Figure 2 - Exemplary Controlled Process

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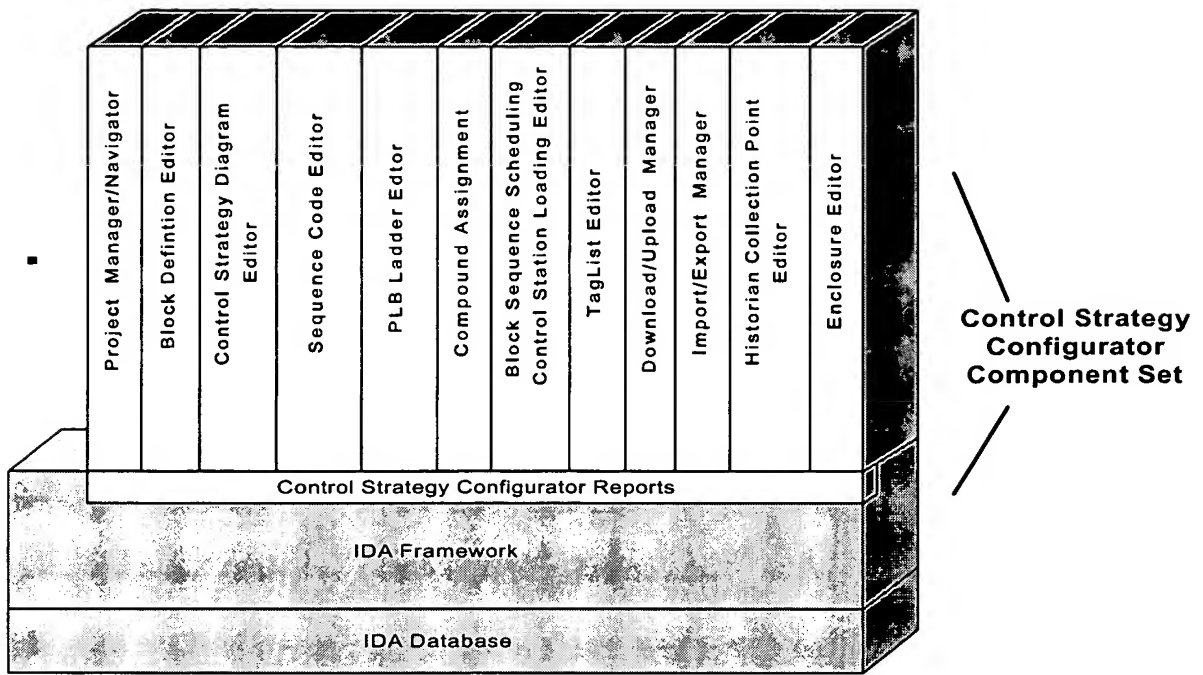
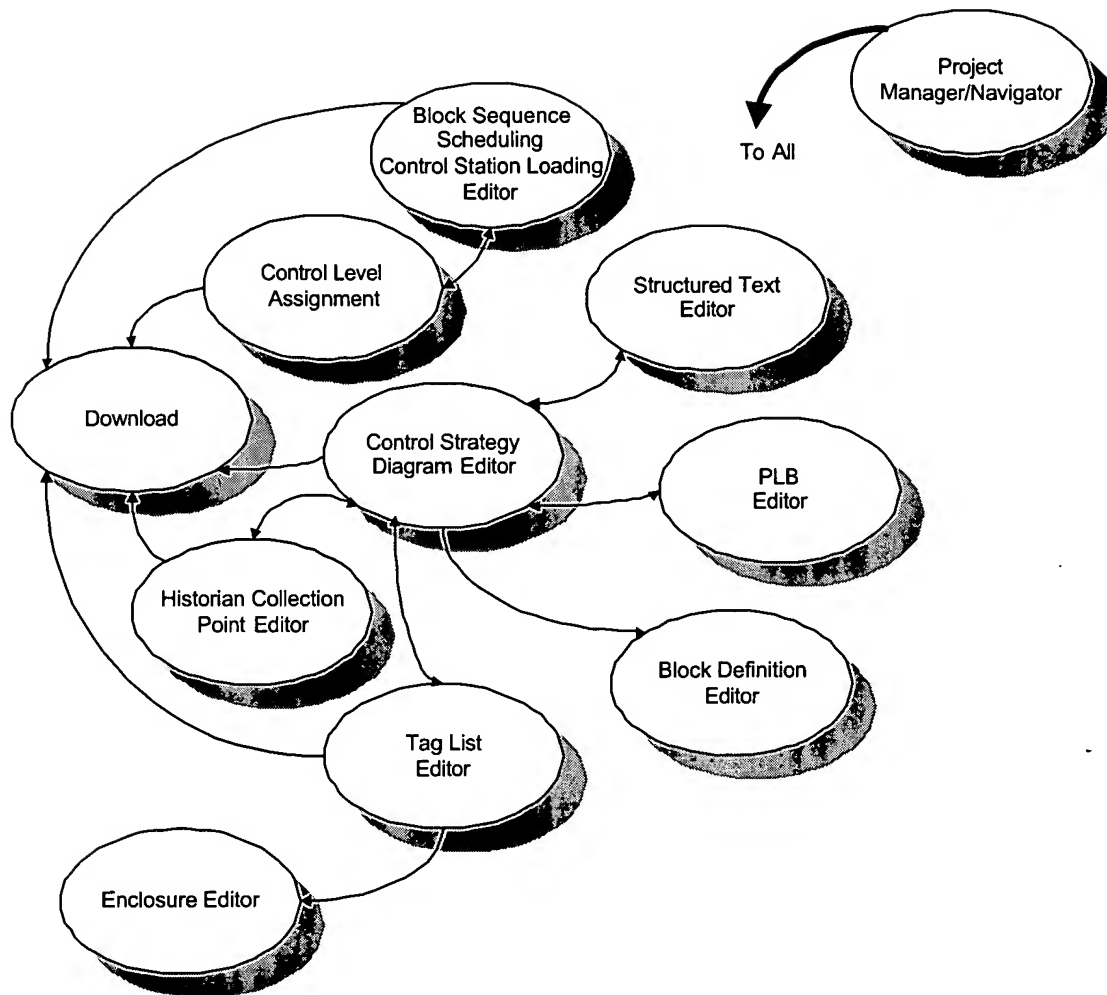


Figure 3 - Control Strategy Configurator Components

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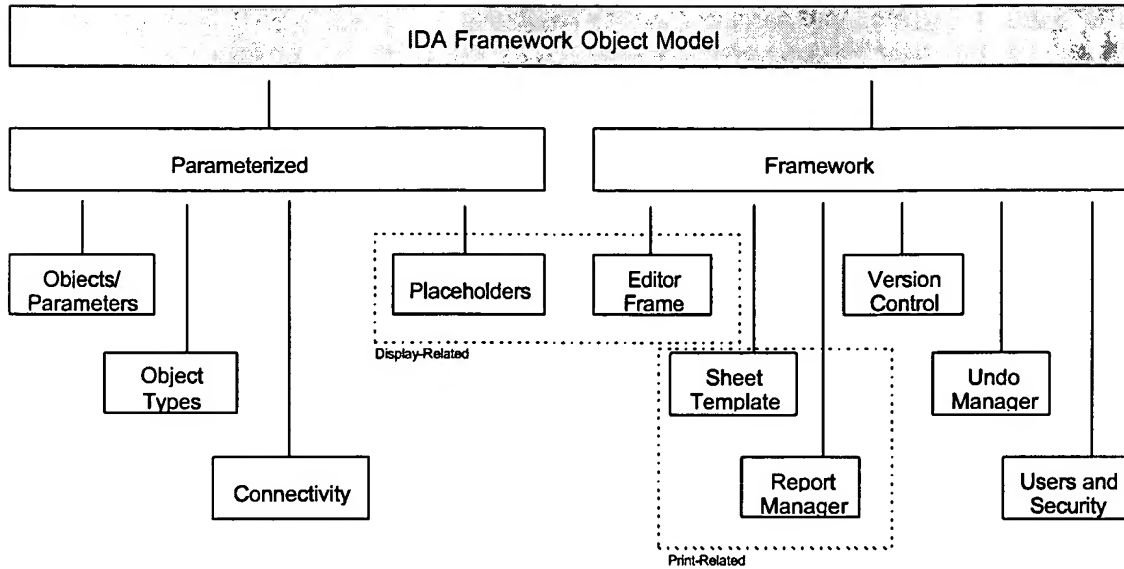
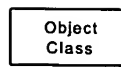
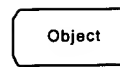


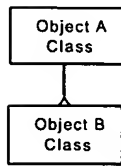
Figure 5 - IDA Framework Object Model Components



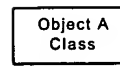
Indicates an object class.



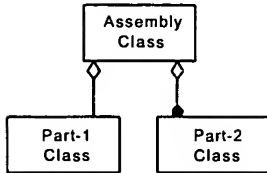
Indicates an instance of Object Class.



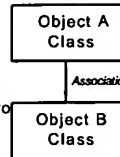
Inheritance - Object B inherits all data and behavior of Object A. Object B differs from Object A by adding methods and/or data, or overriding one or more existing methods in Object A. Object B is typically referred to as a "subclass" of Object A.



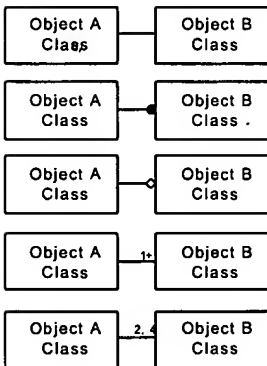
The Object A Class is responsible for creating instances of Object A. The Object A Class is often referred to as the "class factory" for Object A.



Aggregation - Assembly Class is composed of two other classes: Part-1 and Part-2. For each instance of Assembly Class, there is one, and only one, instance of a Part-1 Class, and zero or more instances of a Part-2 Class.



The Object A Class has an association *Association Name* with the Object B Class.



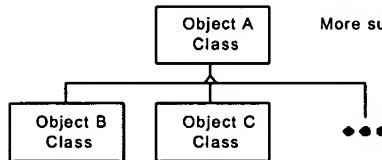
One, and only one, instance of Object B is associated with each instance of Object A (and vice versa).

Zero or more instances of Object B may be associated with each instance of Object A.

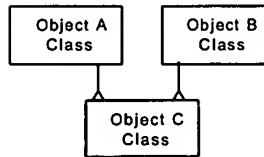
Zero or one instance of Object B are associated with Object A (optional relationship)

One or more instance of Object B are associated with each instance of Object A.

One two or four instances of Object B are associated with each instance of Object A.



More subclasses exist.



Multiple Inheritance - Object C Class inherits the data and methods from both the Object A Class and the Object B Class i.e. Class C objects are subclasses of both Object A and Object B objects..

Figure 6 - Object Model Notation Conventions

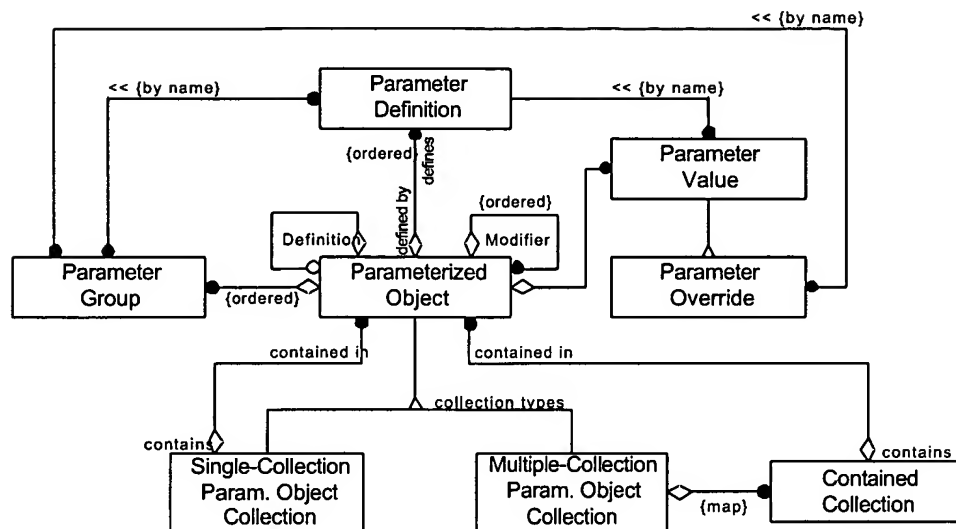


Figure 7 - Parameterized Object Model

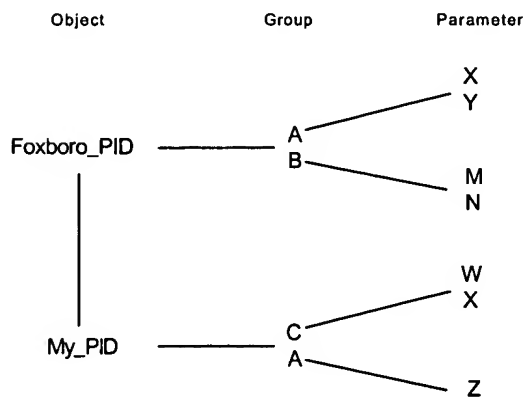


Figure 8 - Parameter Group Inheritance





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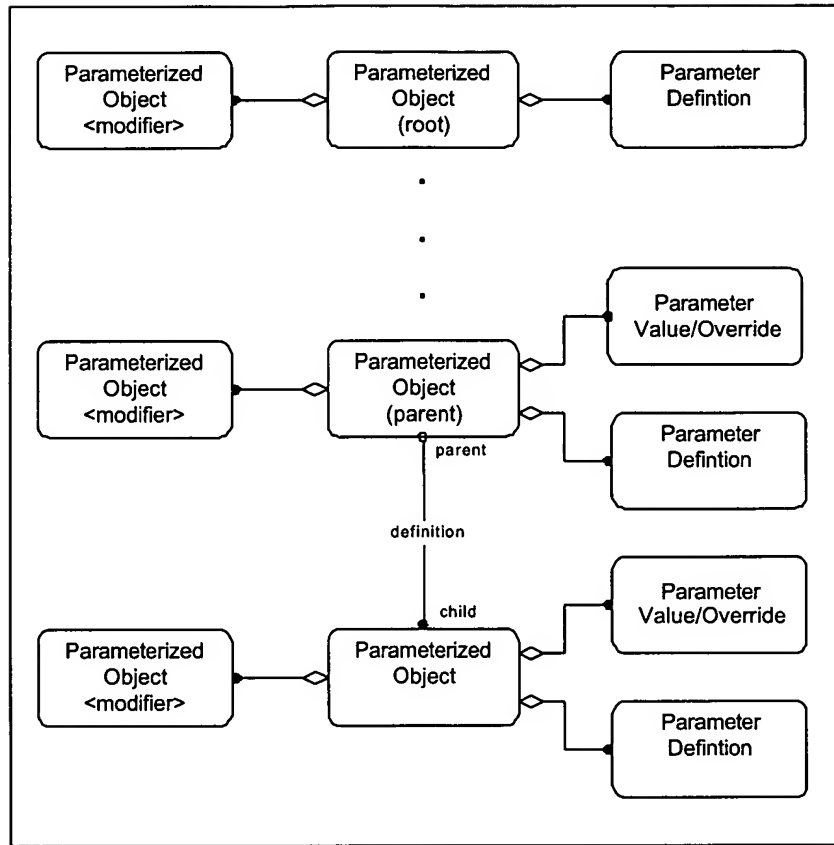


Figure 10 - Creating A Parameter List

The screenshot shows the "Foxboro Parameter Definition" window. It features a menu bar with "File", "Edit", "View", "Window", and "Help". Below the menu bar is a toolbar with various icons. The main area is a table with the following columns: "Defined In", "Parameter", "User Tab", "Label", "Help String", "Tool Tip String", "Edit Control Type", "Format String", and "Choice List". The table has 21 rows, numbered 1 through 21 in the left margin. The status bar at the bottom left shows "Ready".

	Defined In	Parameter	User Tab	Label	Help String	Tool Tip String	Edit Control Type	Format String	Choice List
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									

Figure 11 - Parameter Definition Editor

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AIN

Standard Real-Input Real-Output Bad-Alarm More ...

Achnge	0
Crit	0
Pnt	0
Ptype	0
Rawc	0
Name	
Type	AIN
Descrp	
Period	1
Loopid	
Intma	1
Inhopt	0
Manalm	0
Iomopt	1
Iom_id	
Pnt_no	1
Sci	0
Meas	0
Hsco1	100
Lsco1	0
Dlto1	1
Eo1	%

OK Cancel Download

Figure 12 - Parameter Editor Example

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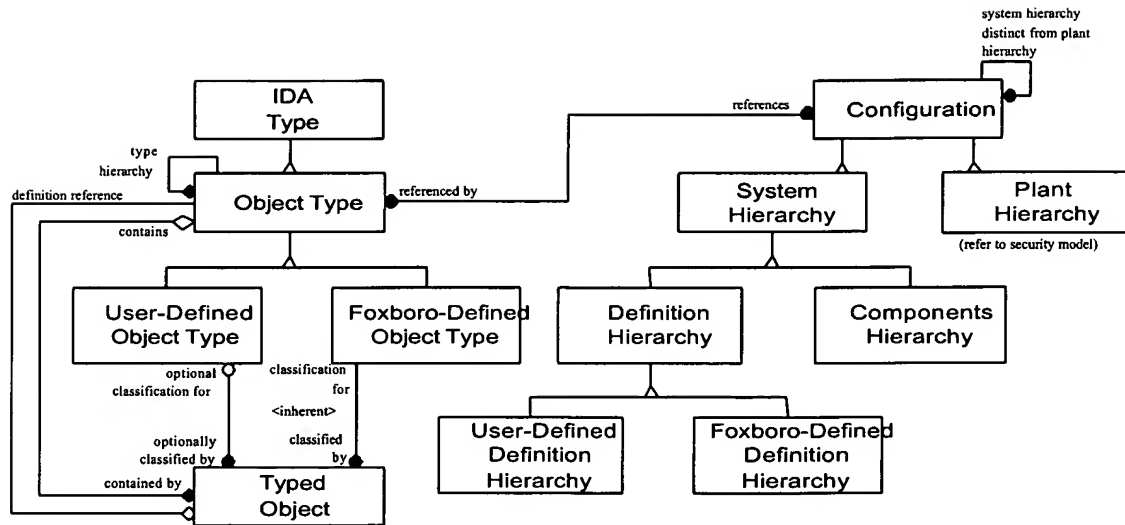


Figure 13 - Object Types

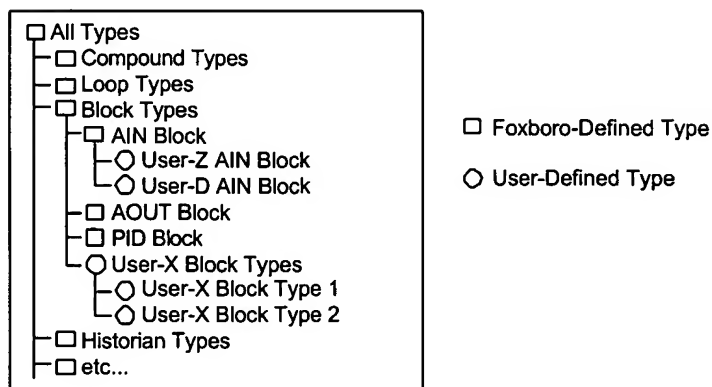


Figure 14 - Object Type Hierarchy Example

**New Object Type**

Object Type:

Description:

Create From:

Creation Method:

☒ Copy ☐ Derive

Attributes:

☒ Configurable  
☒ Downloadable

Assignable To:

☒ System Hierarchy  
☐ Plant Hierarchy

Defined By:

☒ Foxboro ☐ User

Figure 15 - Creating New Object Types

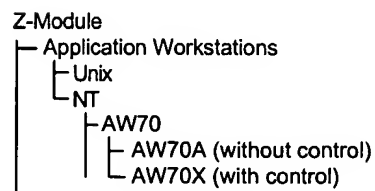


Figure 16 - Type Awareness Example

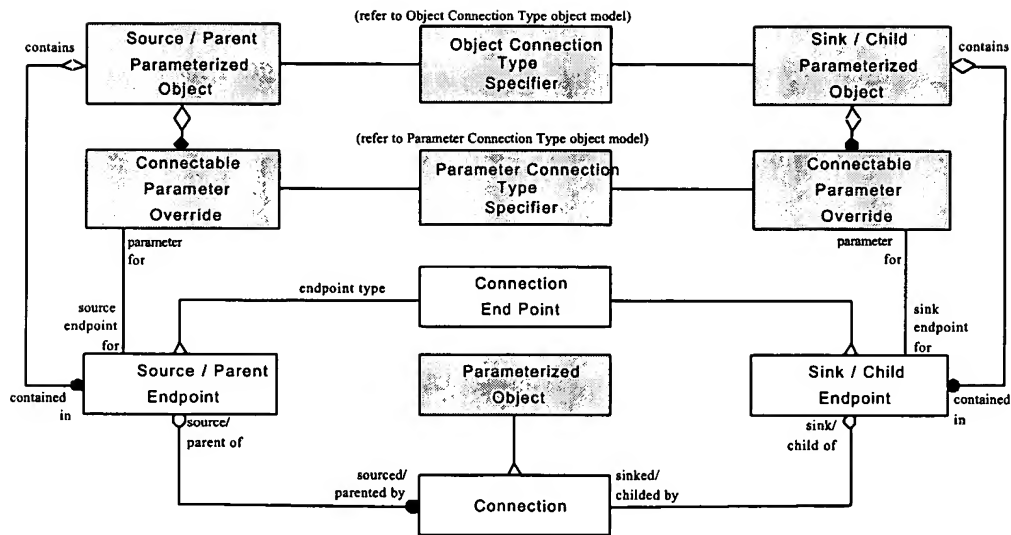


Figure 17 - Connection Object Model

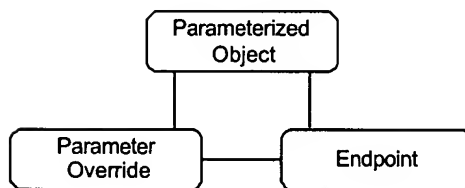


Figure 18 - Parameterized Object - Override - Endpoint Triad

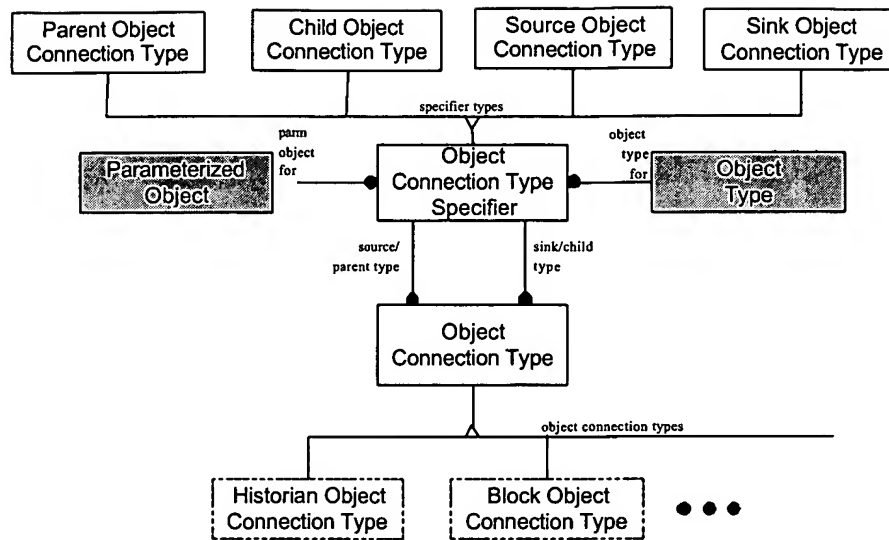


Figure 19 - Object Connection Type Object Model

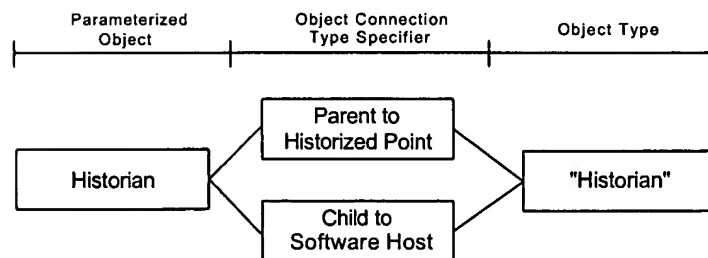


Figure 20 - Example of Simultaneous Parent/Child Object Connectivity

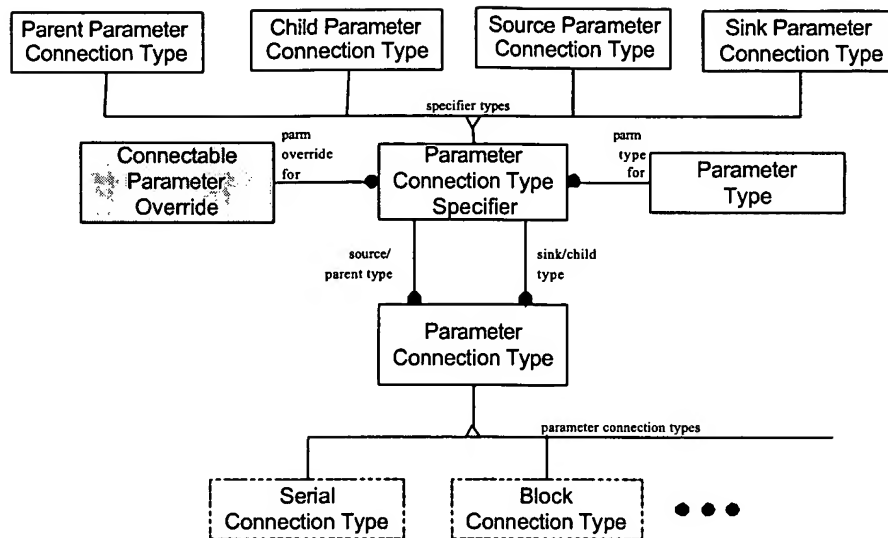


Figure 21 - Parameter Connection Type Object Model

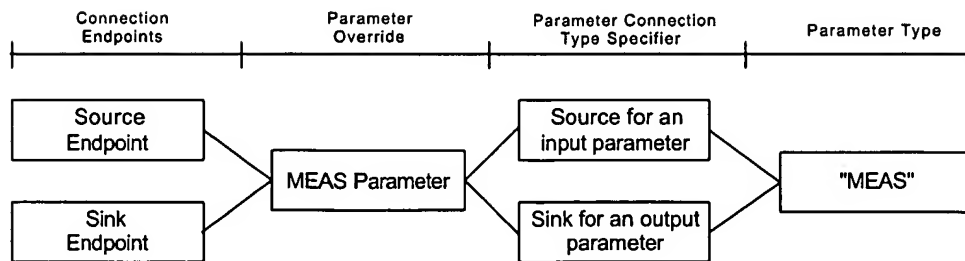


Figure 22 - Example of Simultaneous Source/Sink Parameter Connectivity

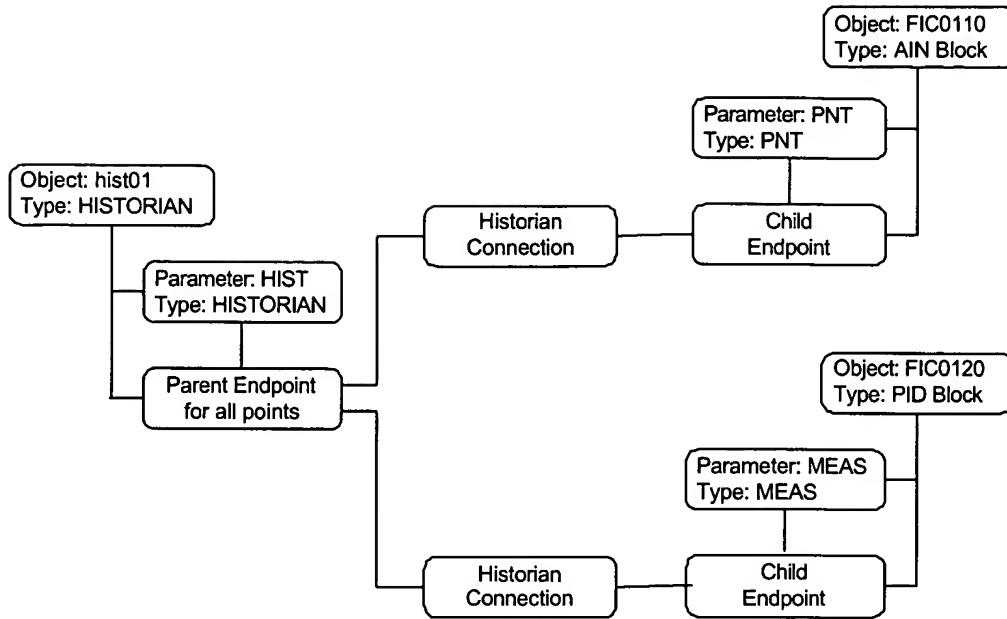


Figure 23 - Parent/Child Connectivity Example - Case #1

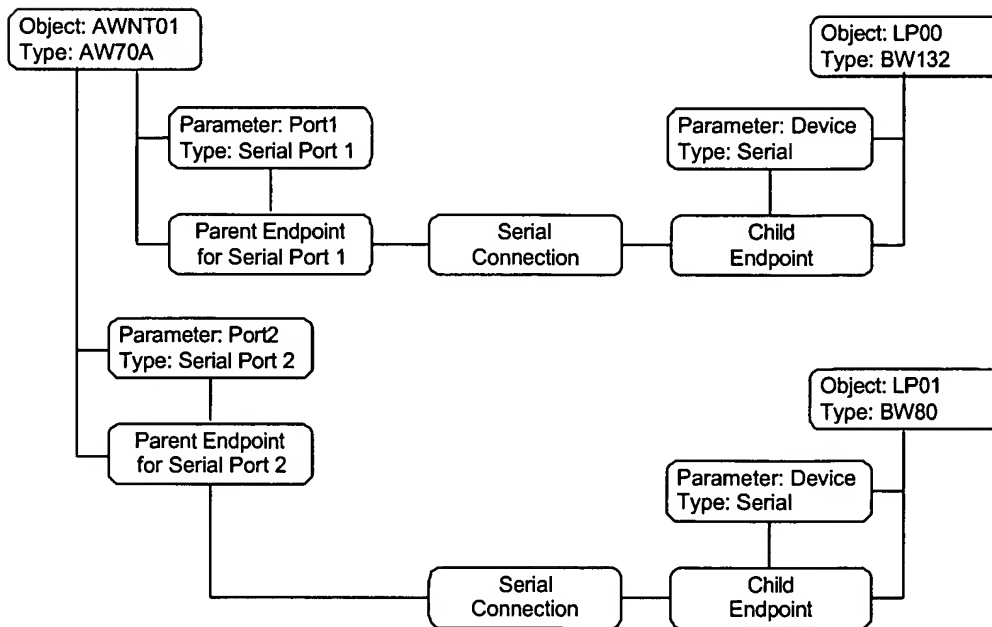


Figure 24 - Parent/Child Connectivity Example - Case #2



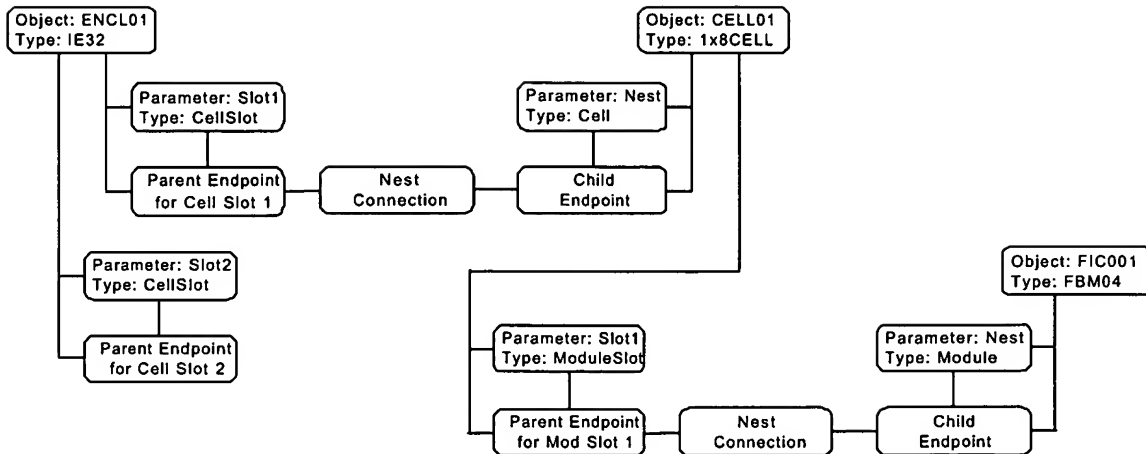


Figure 25 - Parent/Child Connectivity Example (Nest) - Case #3

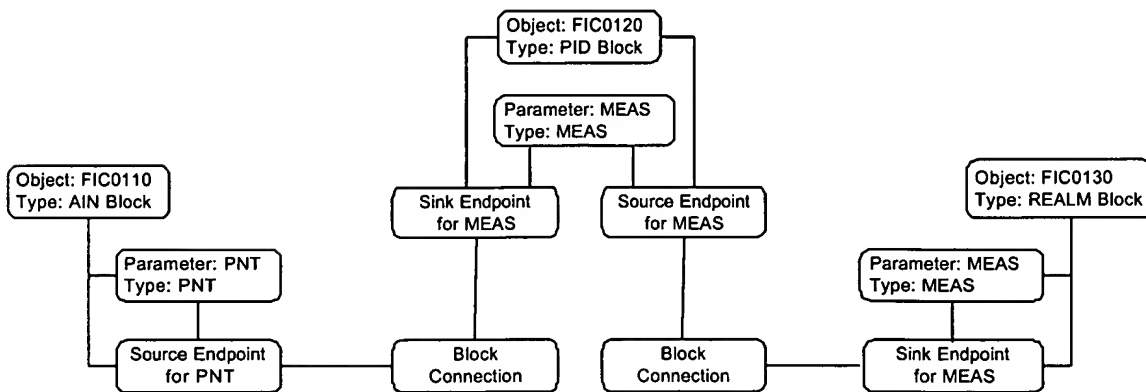


Figure 26 - Source/Sink Connectivity Example

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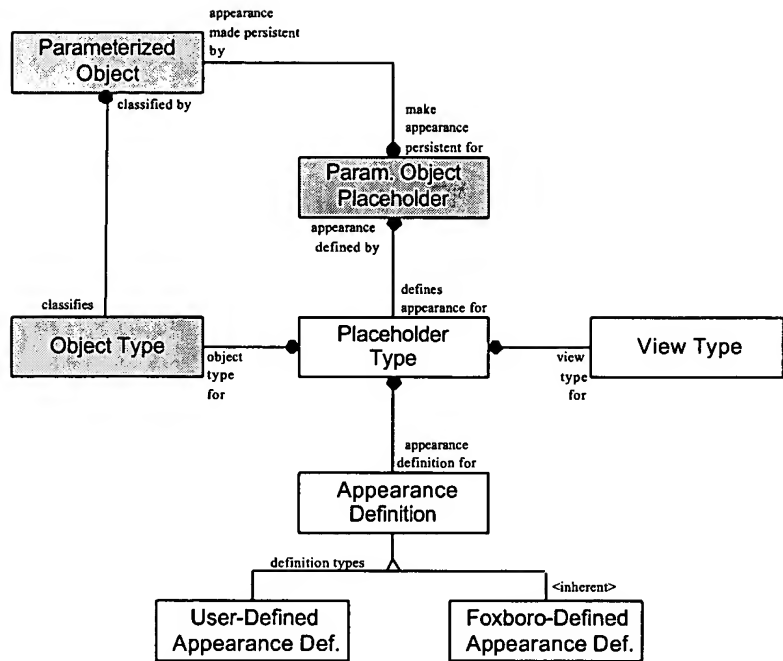


Figure 27 - Appearance Object Model

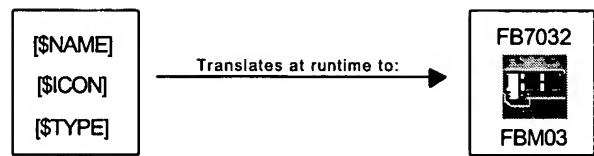


Figure 28 - Appearance Definition Example

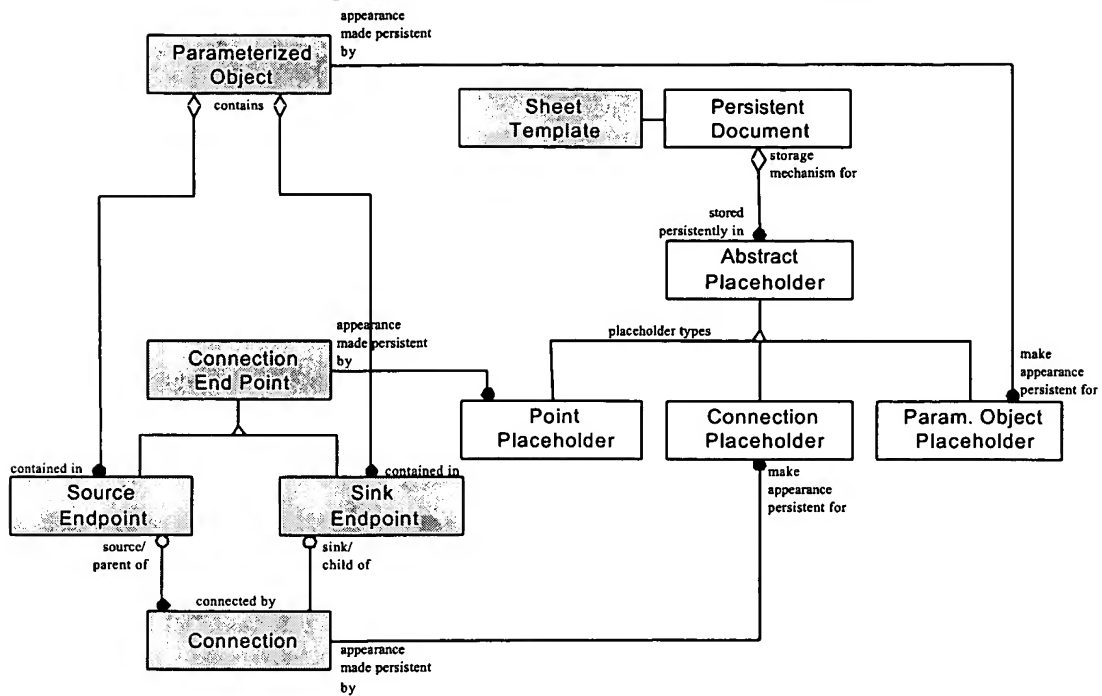


Figure 29A - Placeholders Object Model

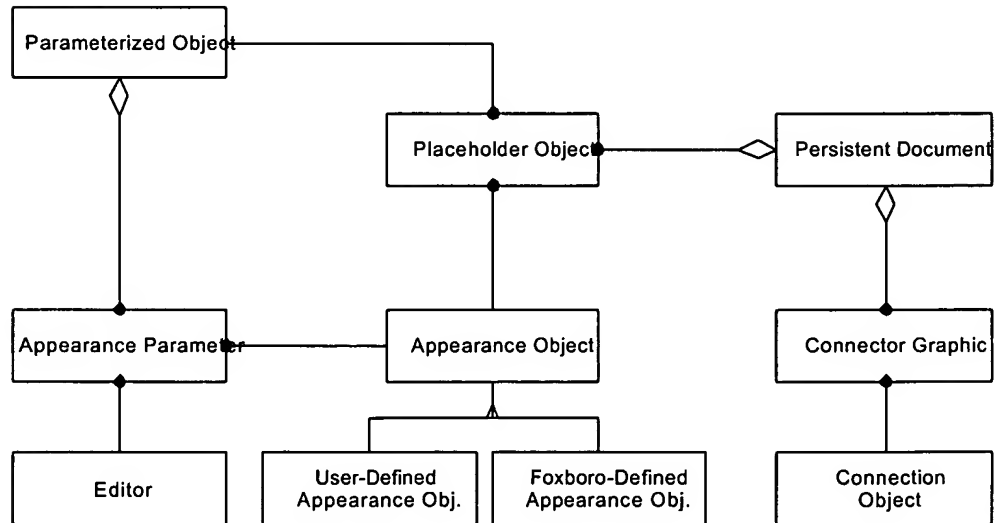


Figure 29B - Combined Placeholder/Appearance Object Model

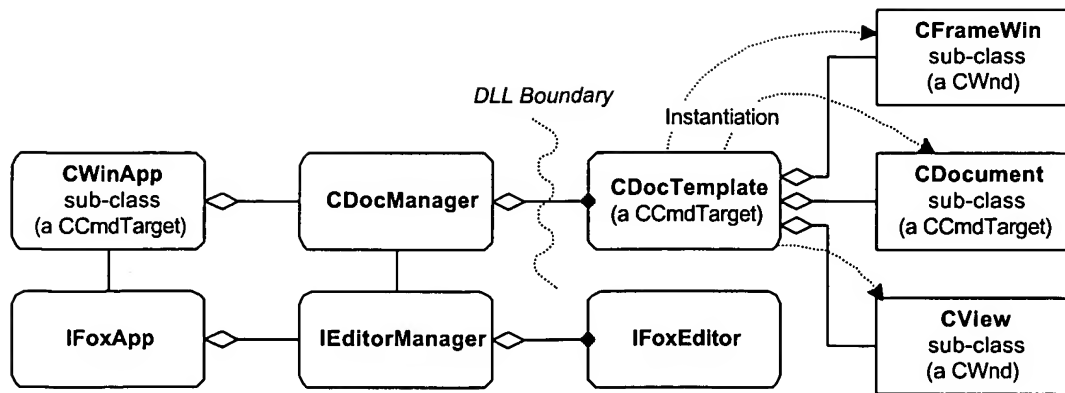


Figure 30 - MFC Document/View Architecture

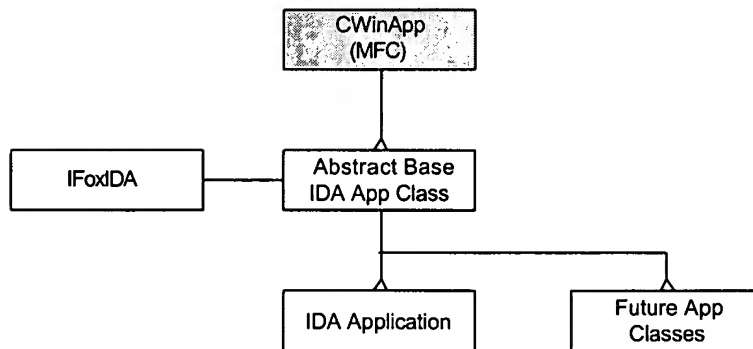


Figure 31 - The IDA Application Class Architecture

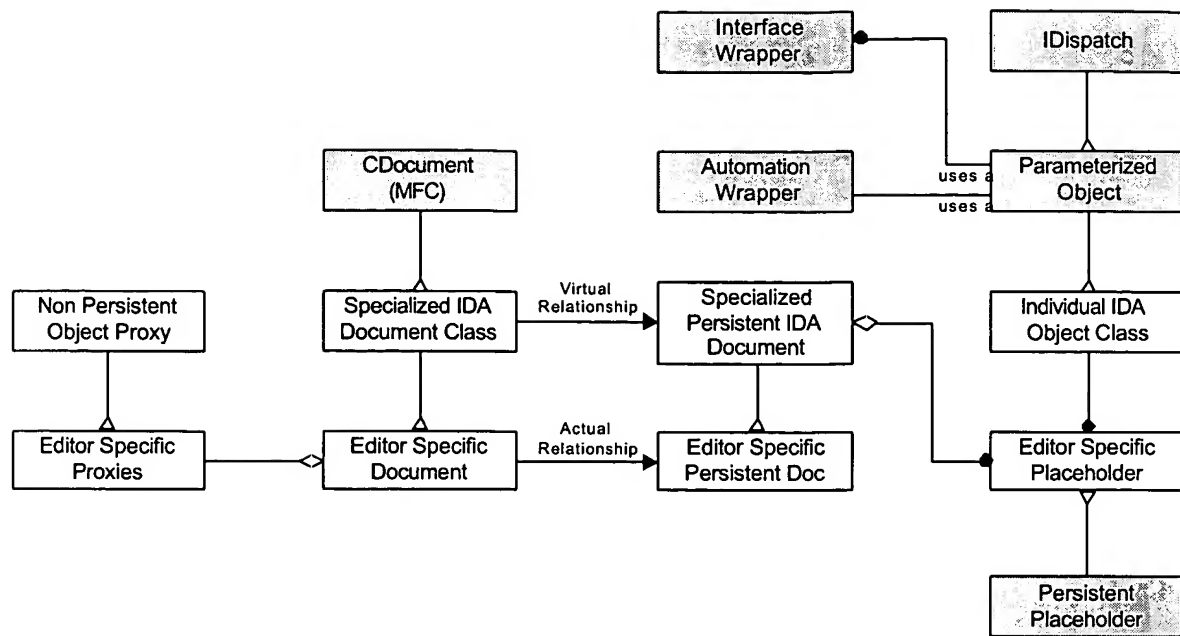


Figure 32 - The IDA Document Architecture

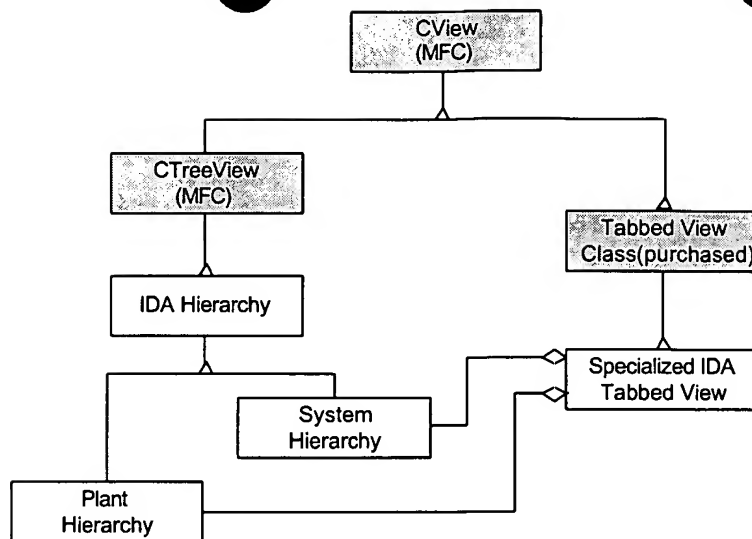


Figure 33 – IDA Hierarchy Classes

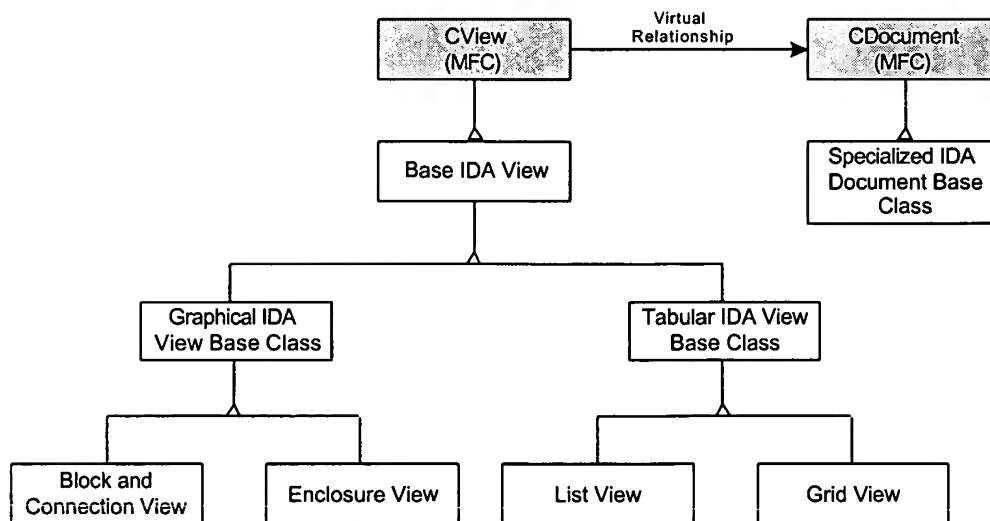


Figure 34 - The IDA View Classes

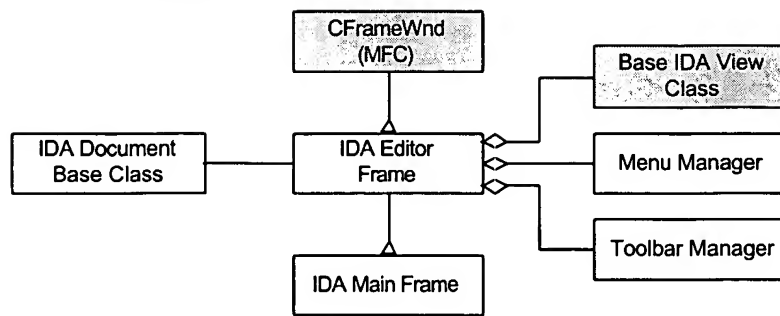


Figure 35 - The IDA Frame Classes

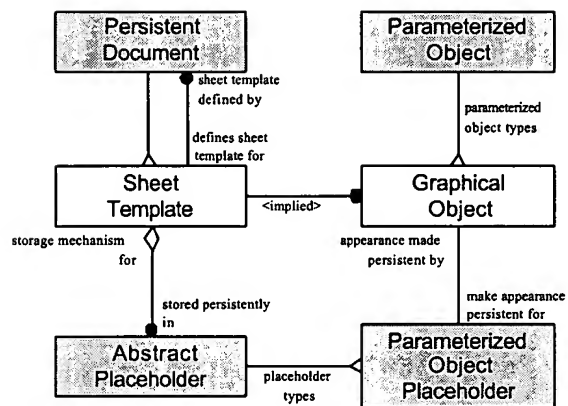


Figure 36 - Sheet Templates Object Model

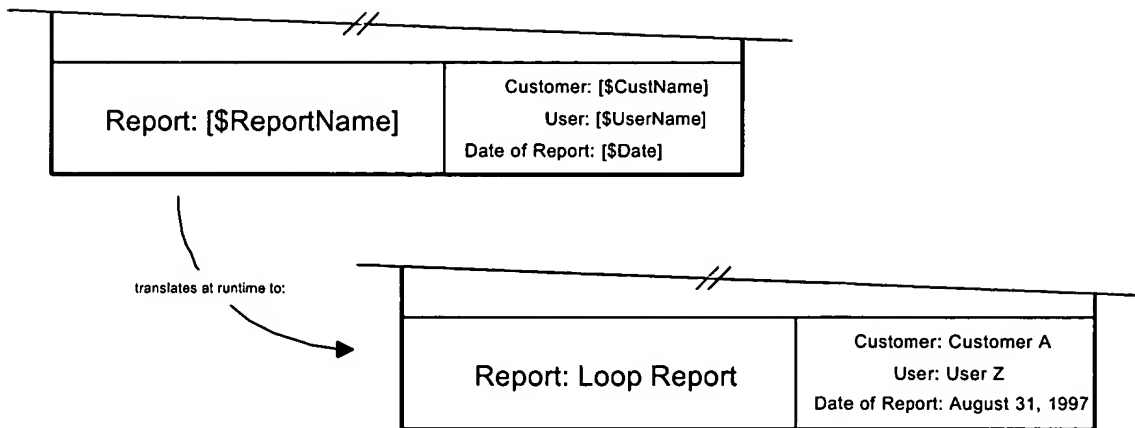


Figure 37 - Sample Use of Macros in Sheet Template

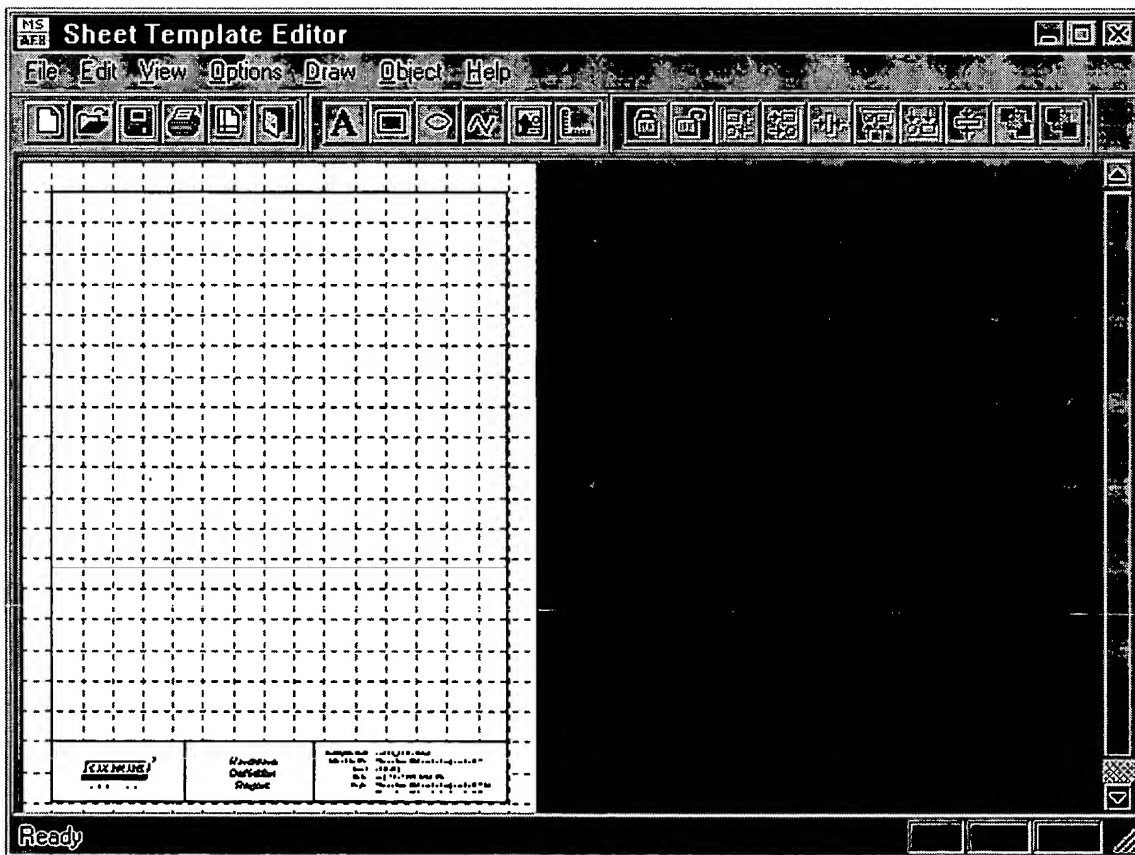


Figure 38 - Sheet Template Editor



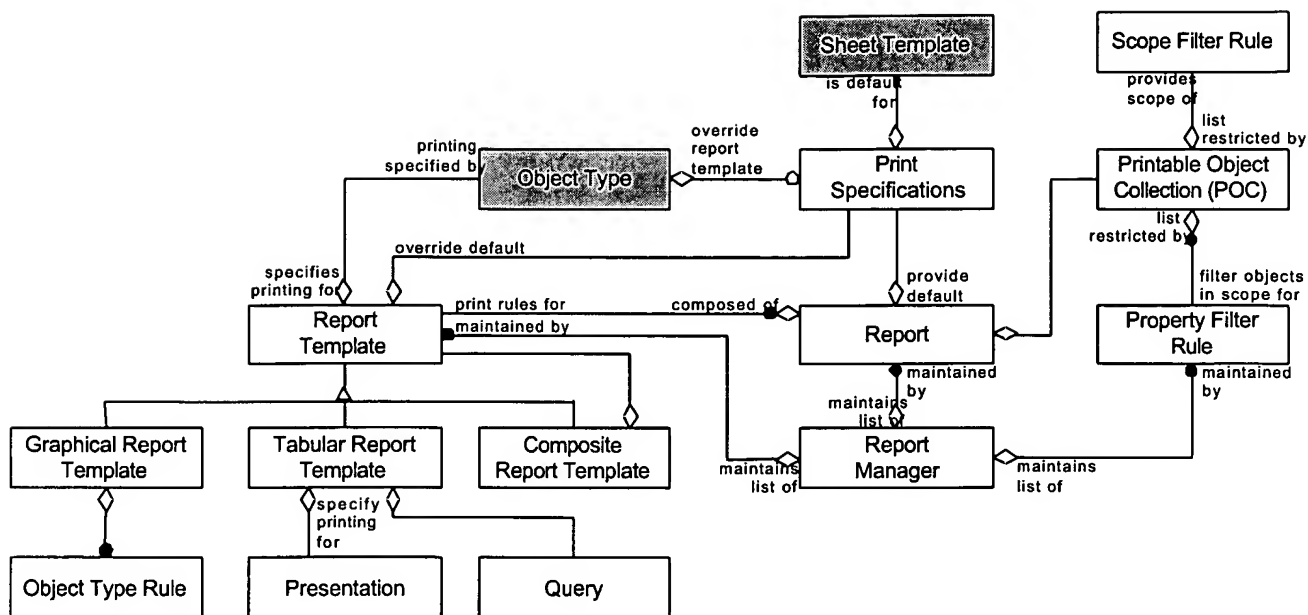


Figure 39 - The IDA Report Manager Object Model

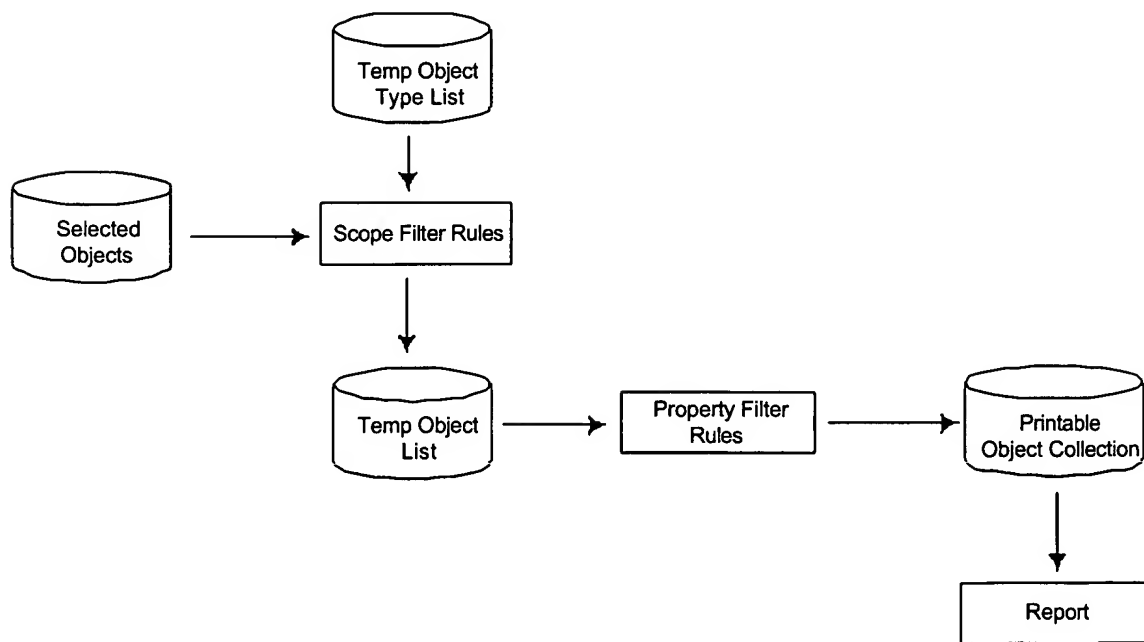


Figure 40 - Applying Filter Rules to POC

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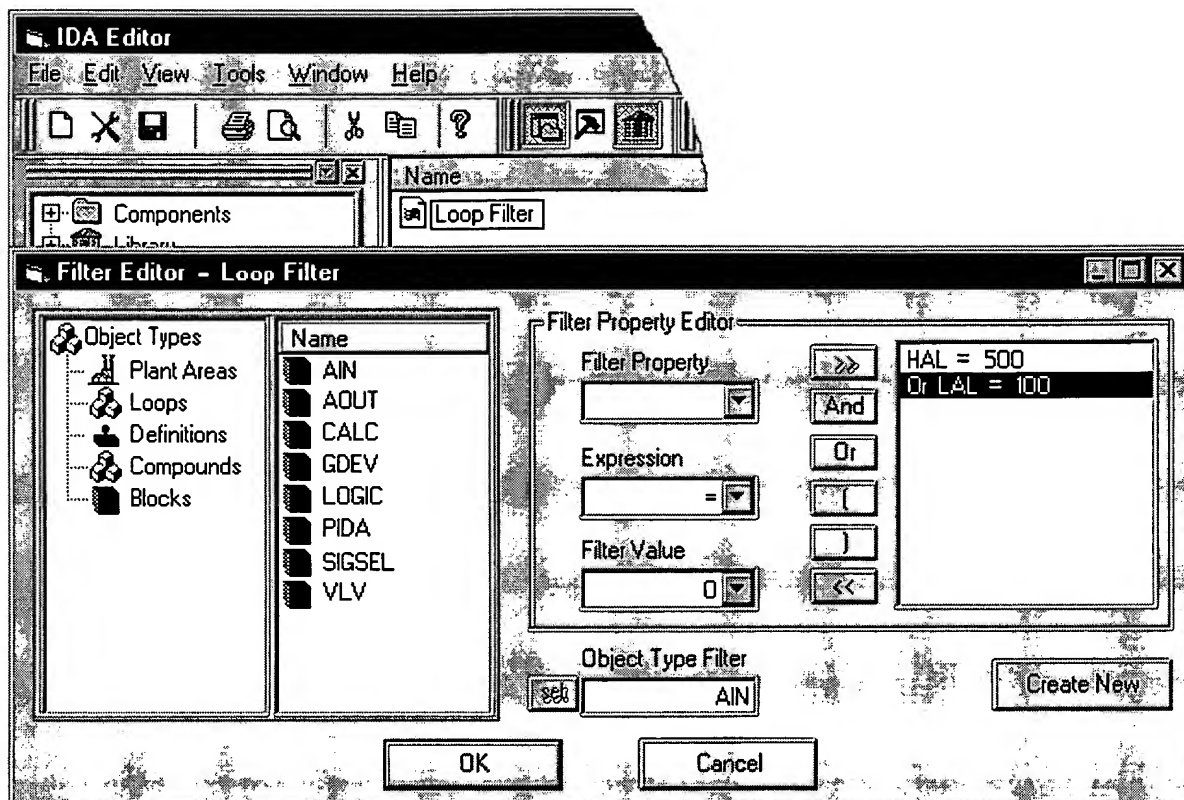


Figure 41 – Filter Editor

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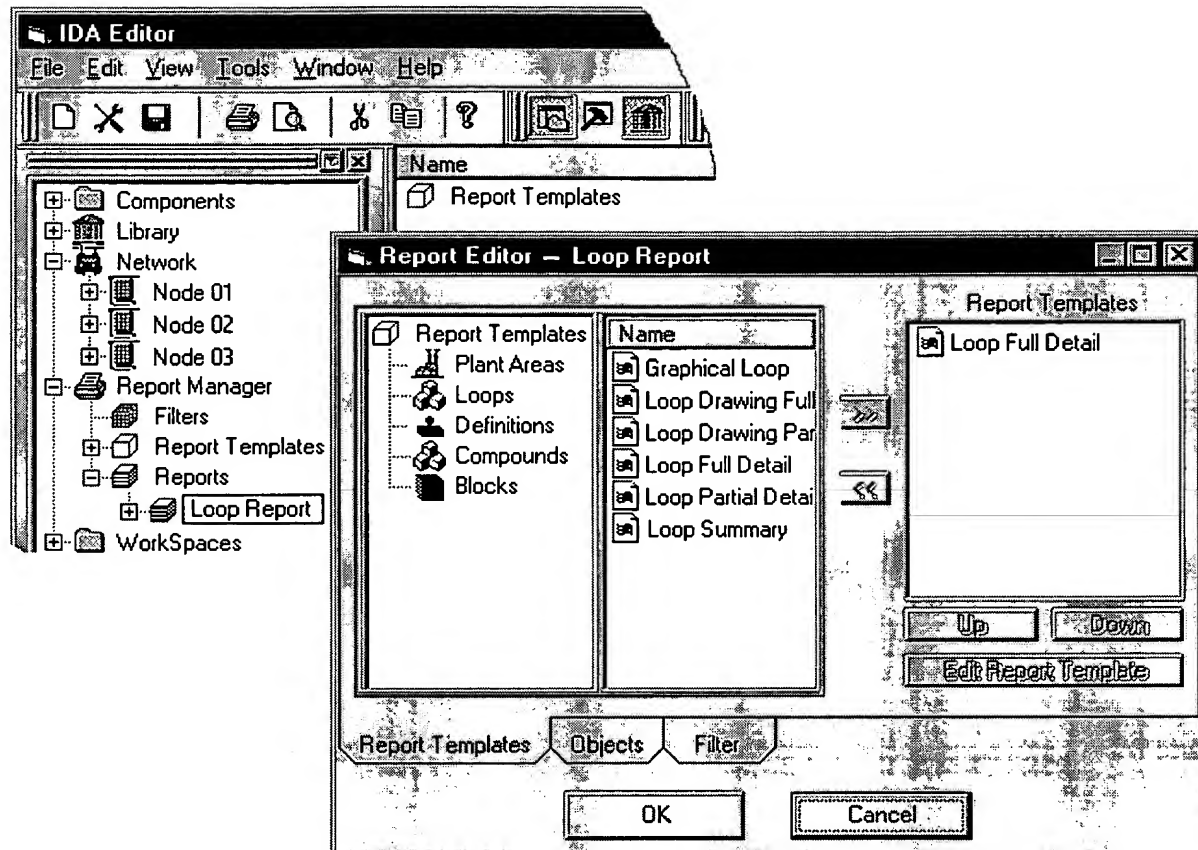


Figure 43 - Report Editor

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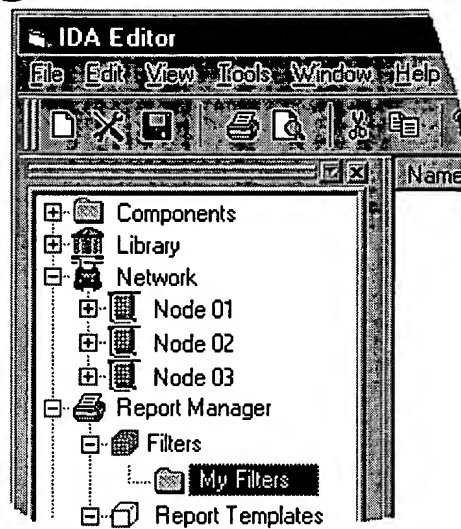


Figure 44 - Organizational Folders

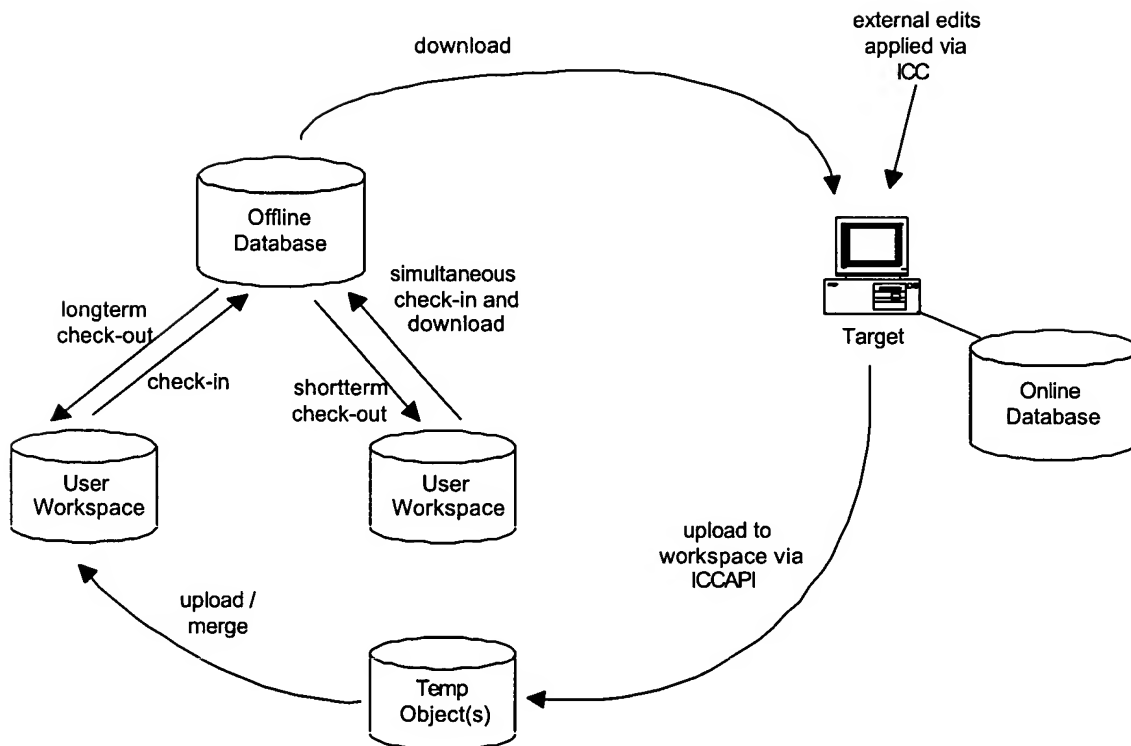


Figure 45 - Version Control - Basic Concepts

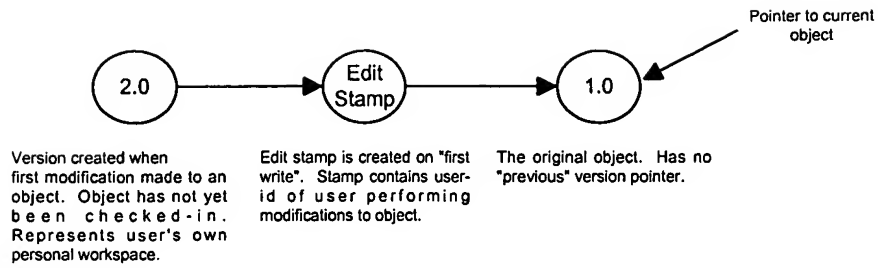


Figure 46 - Object Check-Out

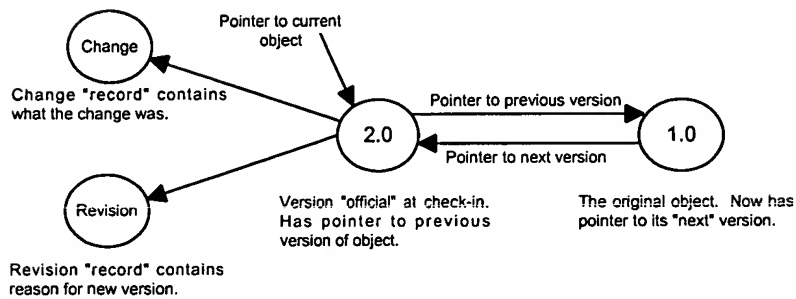


Figure 47 - Object Check-In

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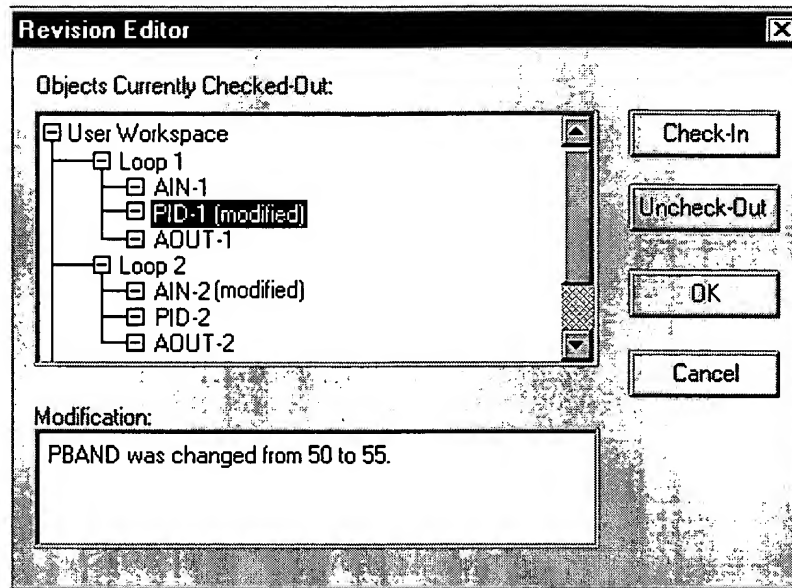


Figure 48 - Revision Editor

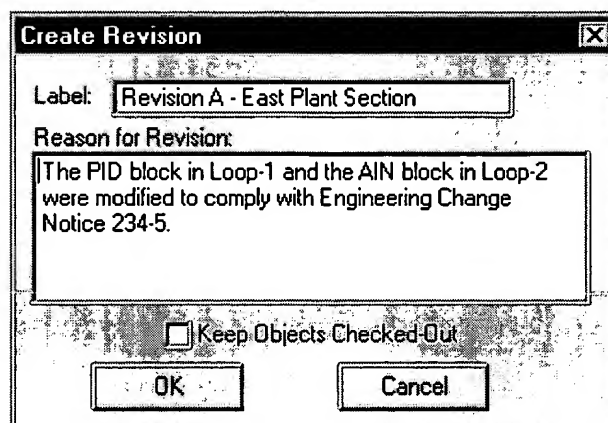


Figure 49 - Create Revision Dialog Box

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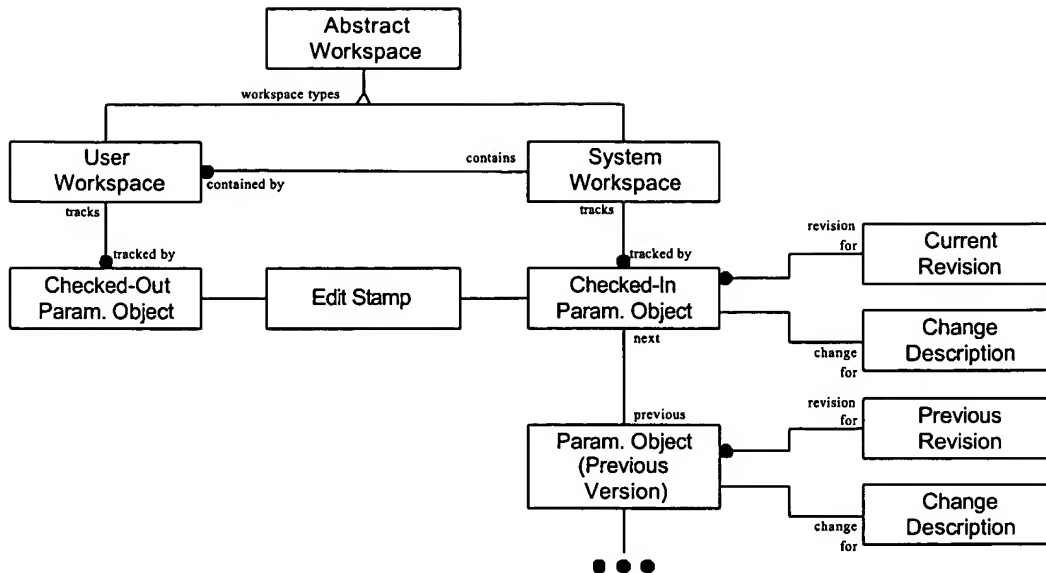


Figure 51 - Version Control Object Model

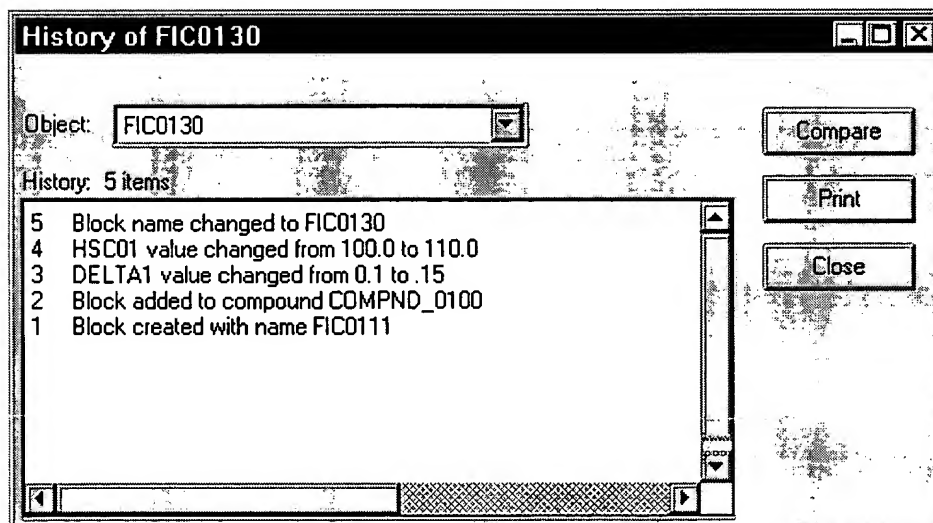


Figure 52 - Version History

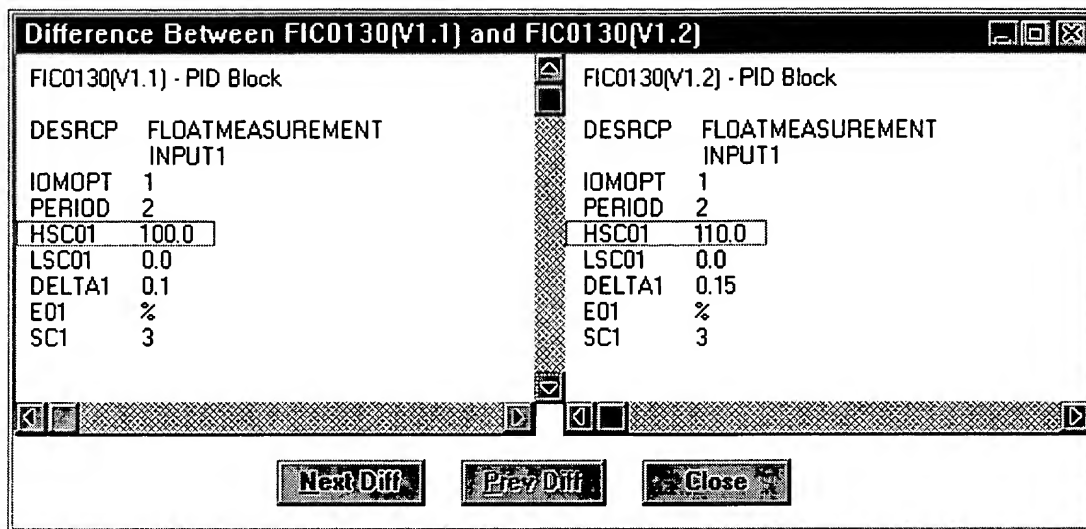


Figure 53 - Object Compare Utility

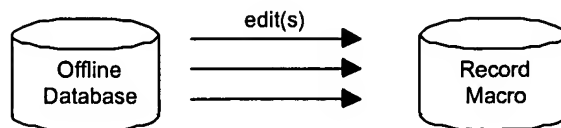


Figure 54 - Historical Archive with Playback Macro

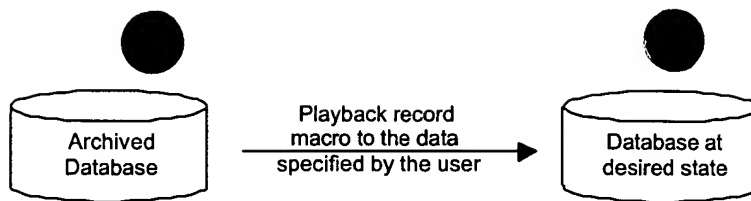


Figure 55 - Performing a Macro Playback

Object: PID2		Object Audit Trail: V1.0 to V1.2		
Version	Date	User	Modification	Reason for Modification
V1.0	09/27/97	MBJ	Object created.	
V1.1	09/29/97	MBJ	PBAND changed from 40 to 50.	FBM added to loop A.
V1.2	10/04/97	JKL	PBAND readjusted to 45.	Finetuning loop parameters.

Figure 56 - Sample Audit Trail Report

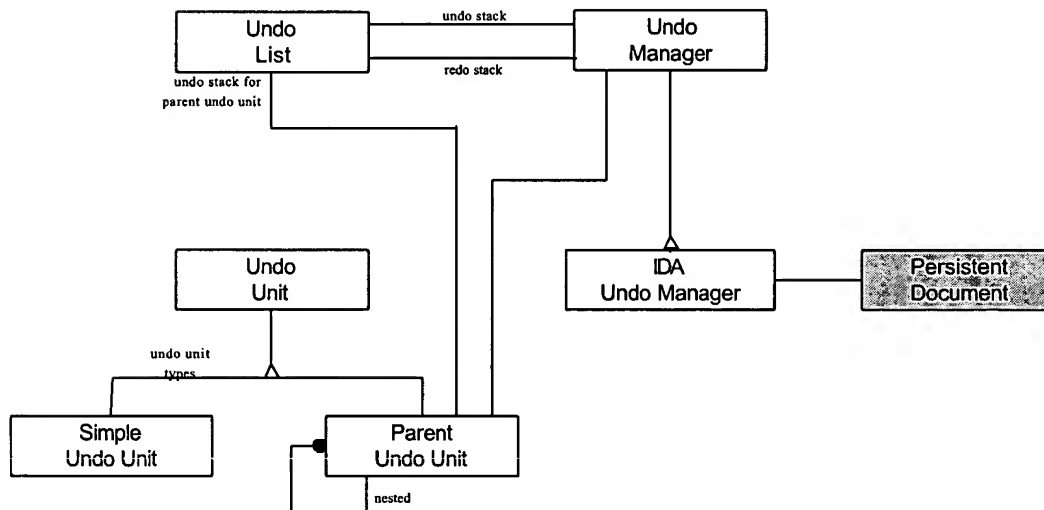


Figure 57 - Undo Manager Object Model

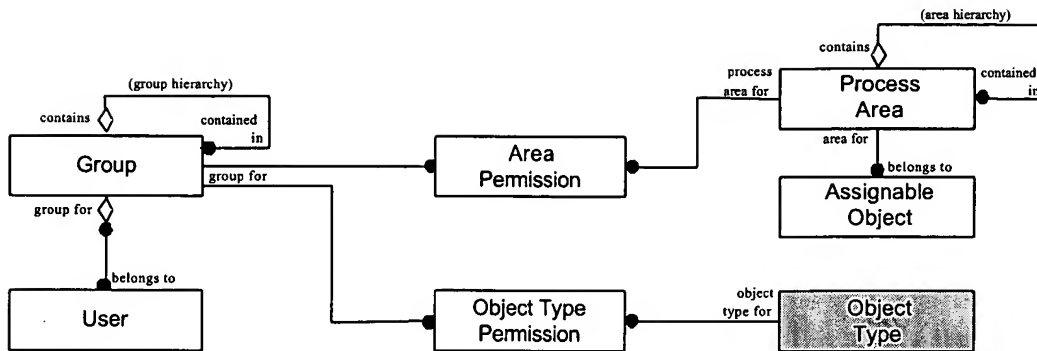


Figure 58 - Users and Security Object Model

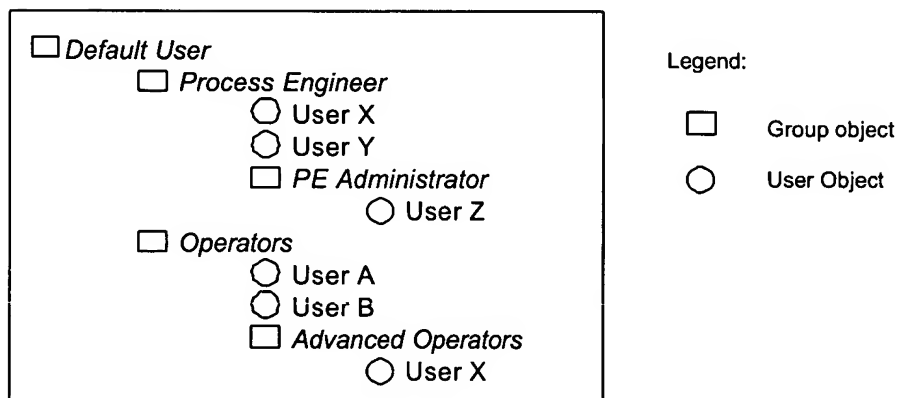
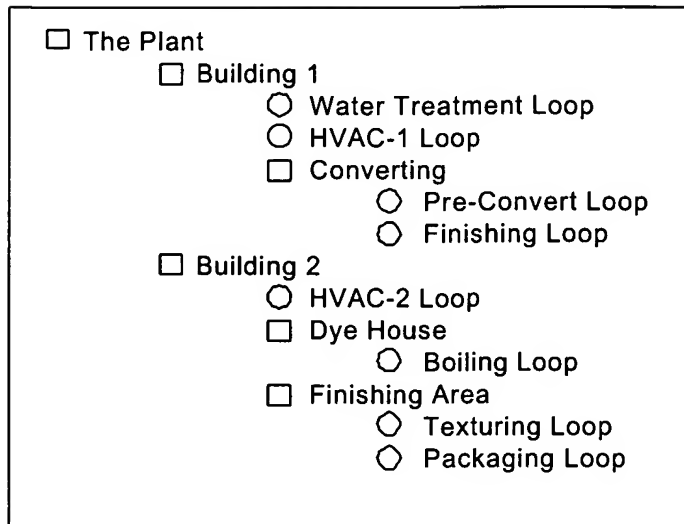


Figure 59 - Users and Groups Example



Legend:

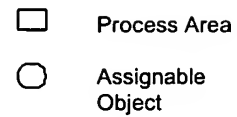


Figure 60 - Process Area and Assignable Objects Example

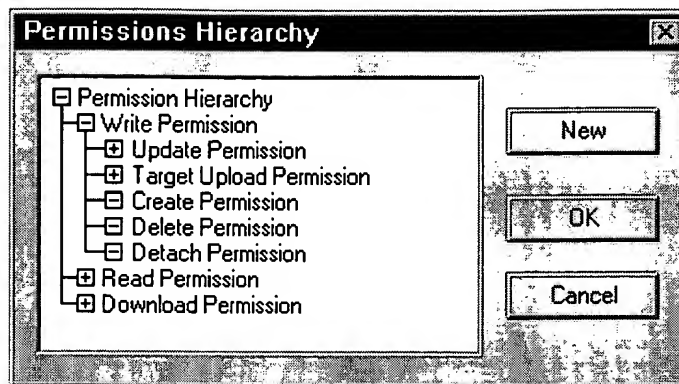


Figure 61 - IDA Permissions Hierarchy

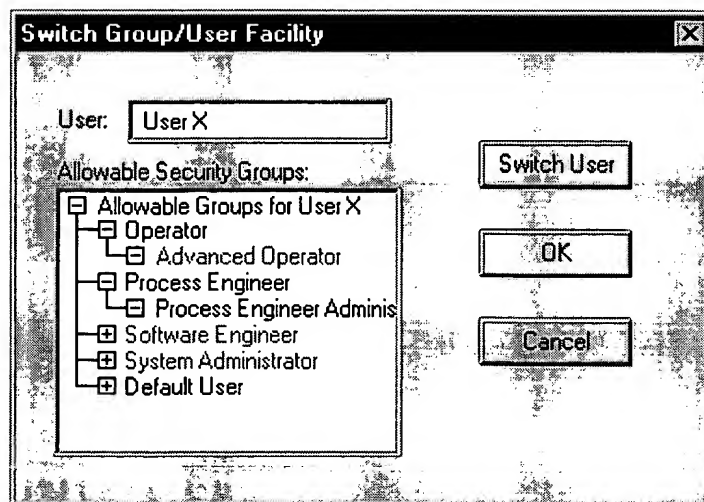


Figure 62 - Switch Group/User Capability

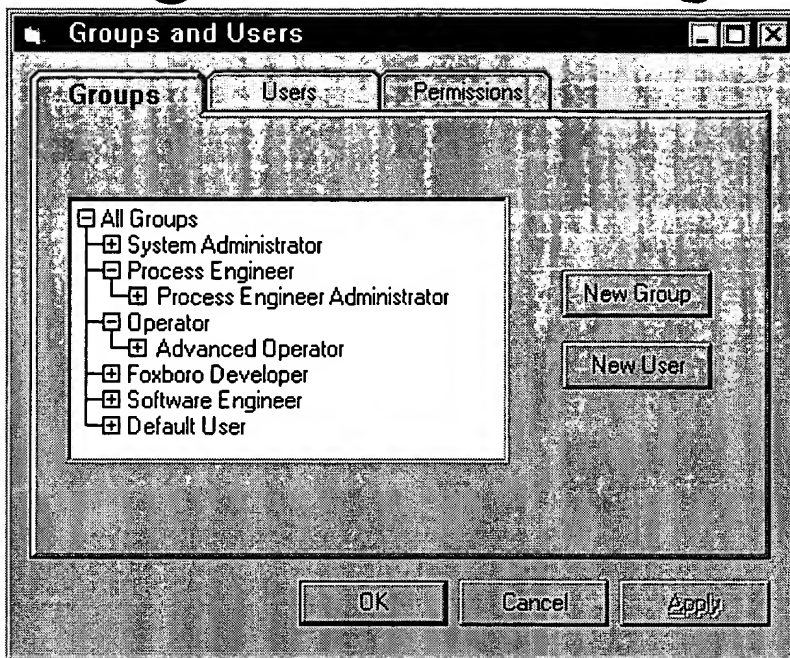


Figure 63 - Managing Groups

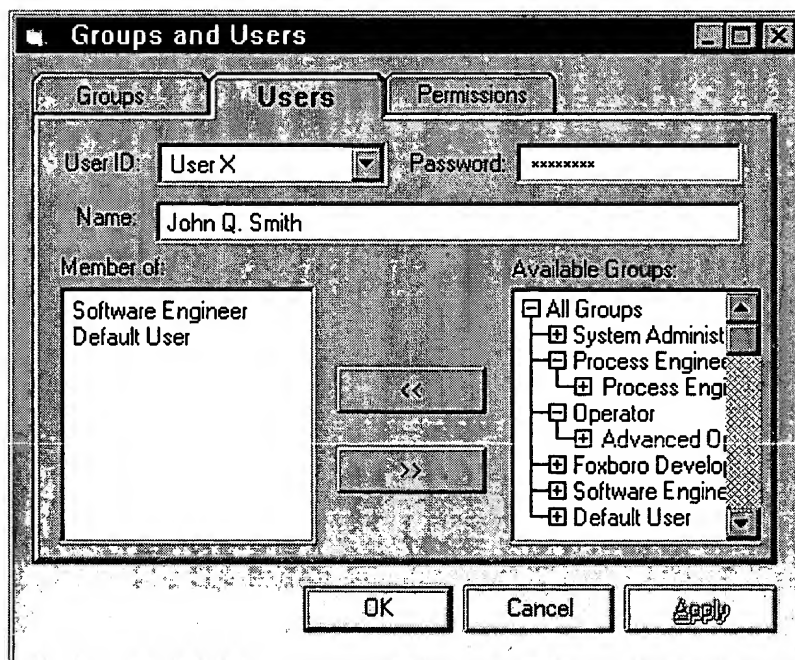


Figure 64 - Assigning Users to Groups

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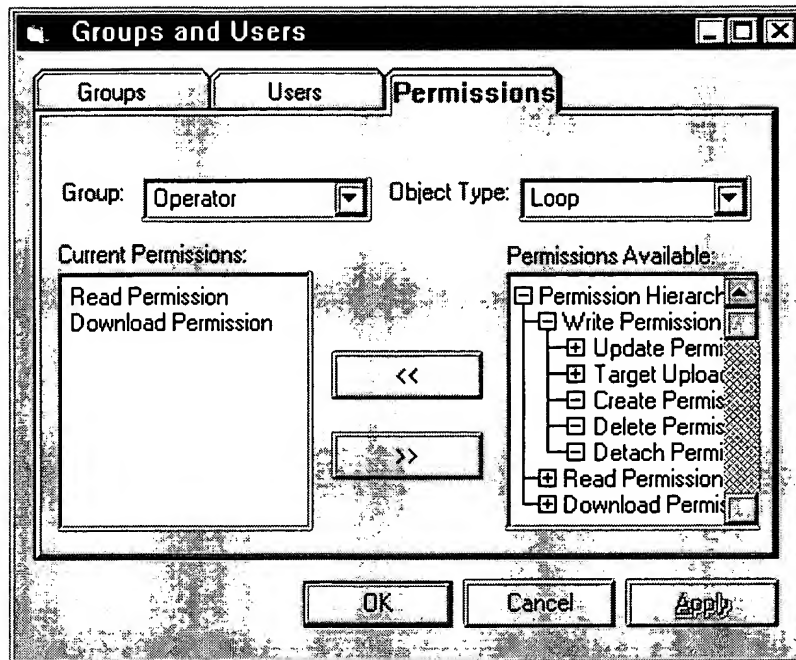


Figure 65 - Groups, Object Types and Permissions

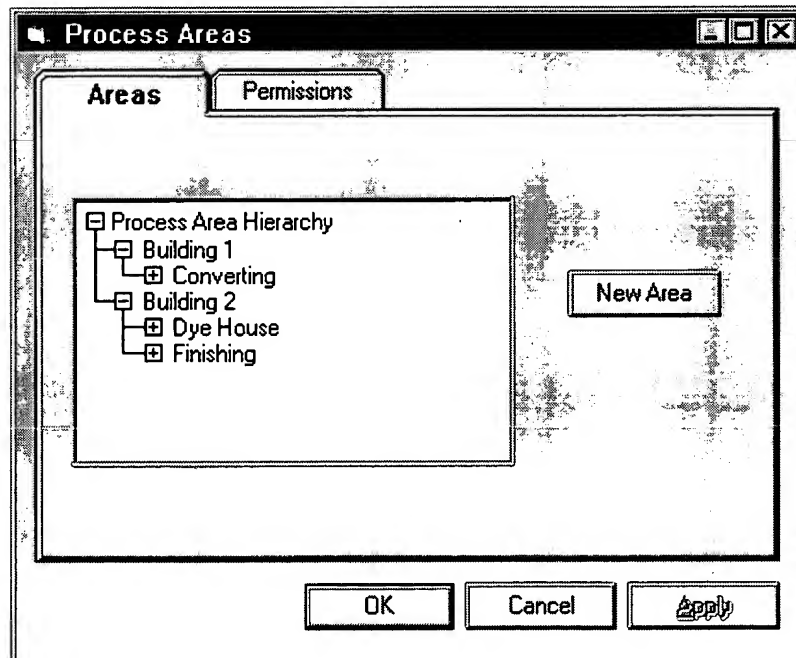


Figure 66 - Managing Process Areas





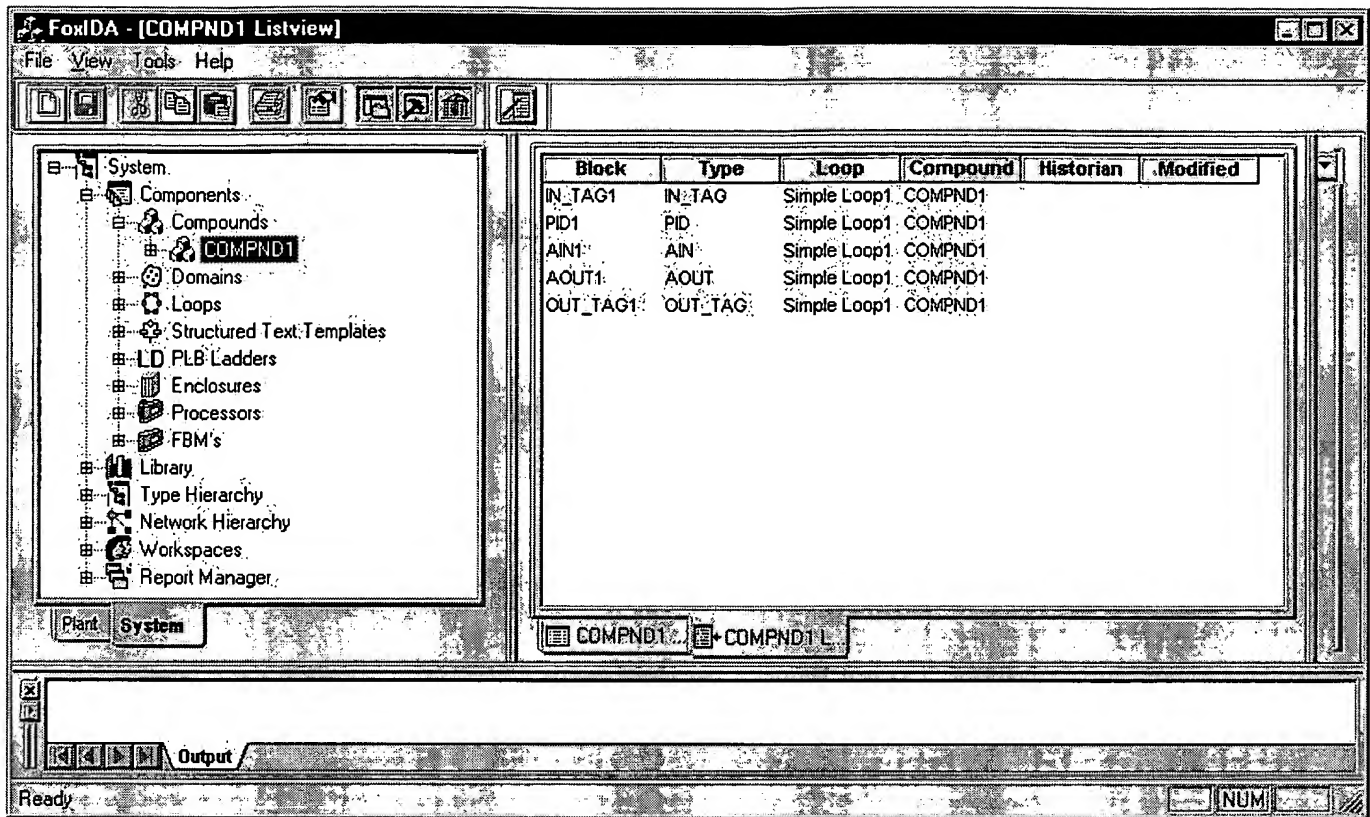


Figure 68 - System TreeView

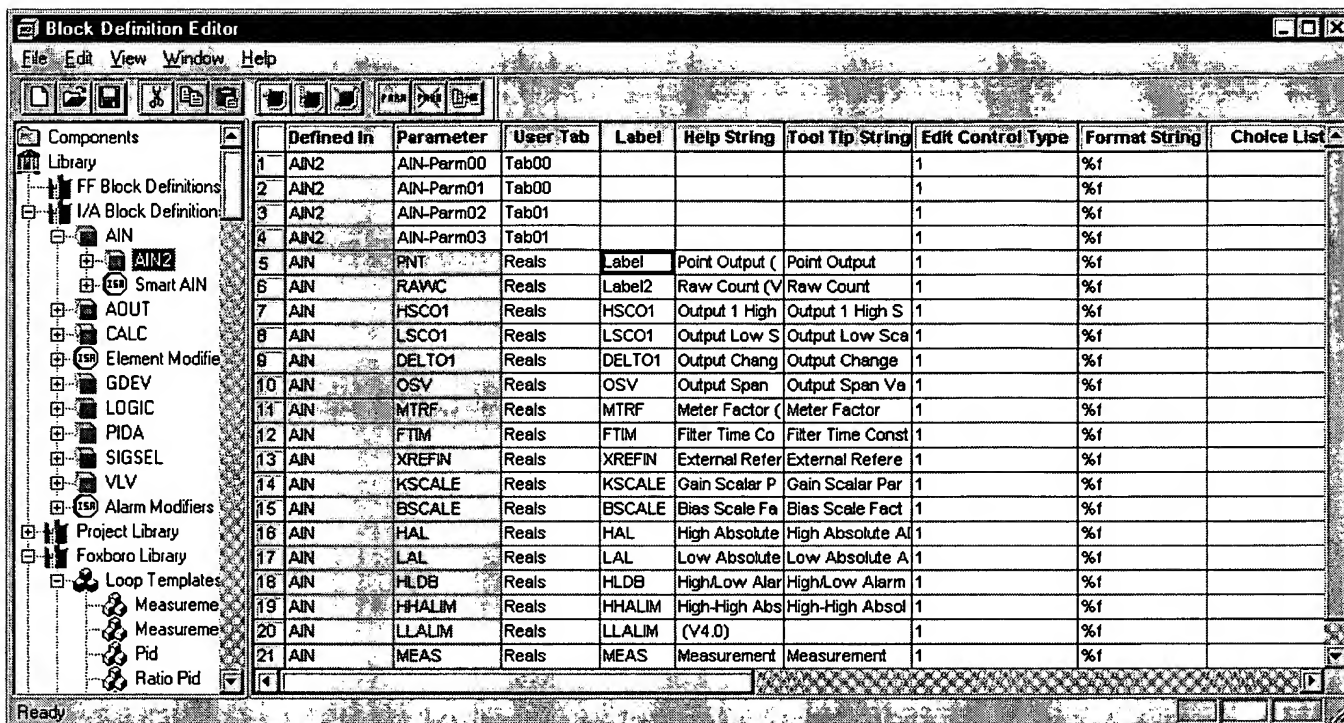


Figure 69 - Block Definition Editor

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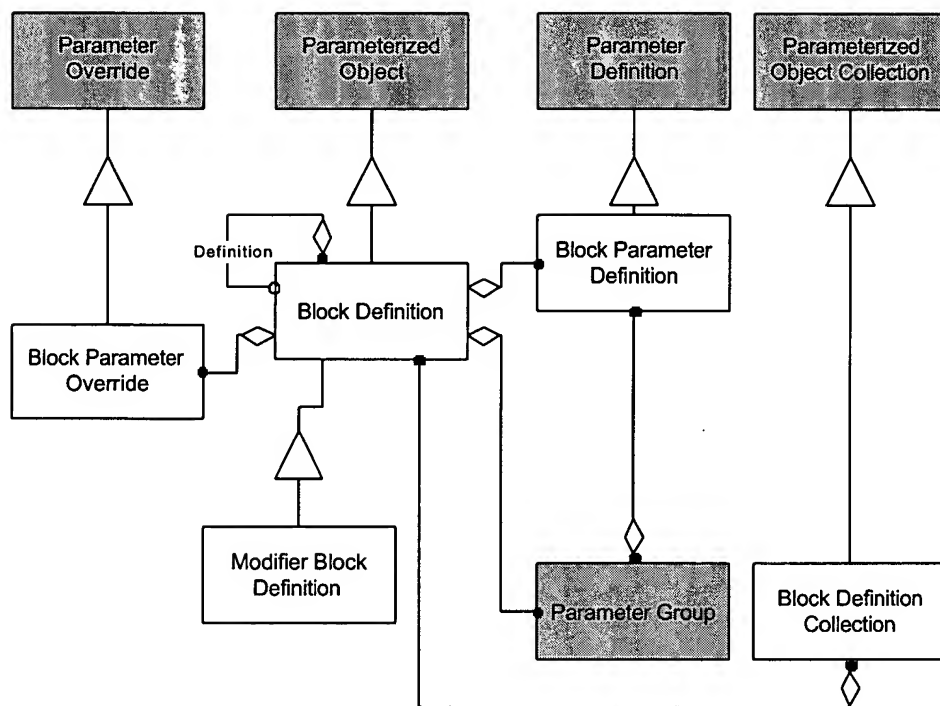


Figure 70. Block Definition Classes.

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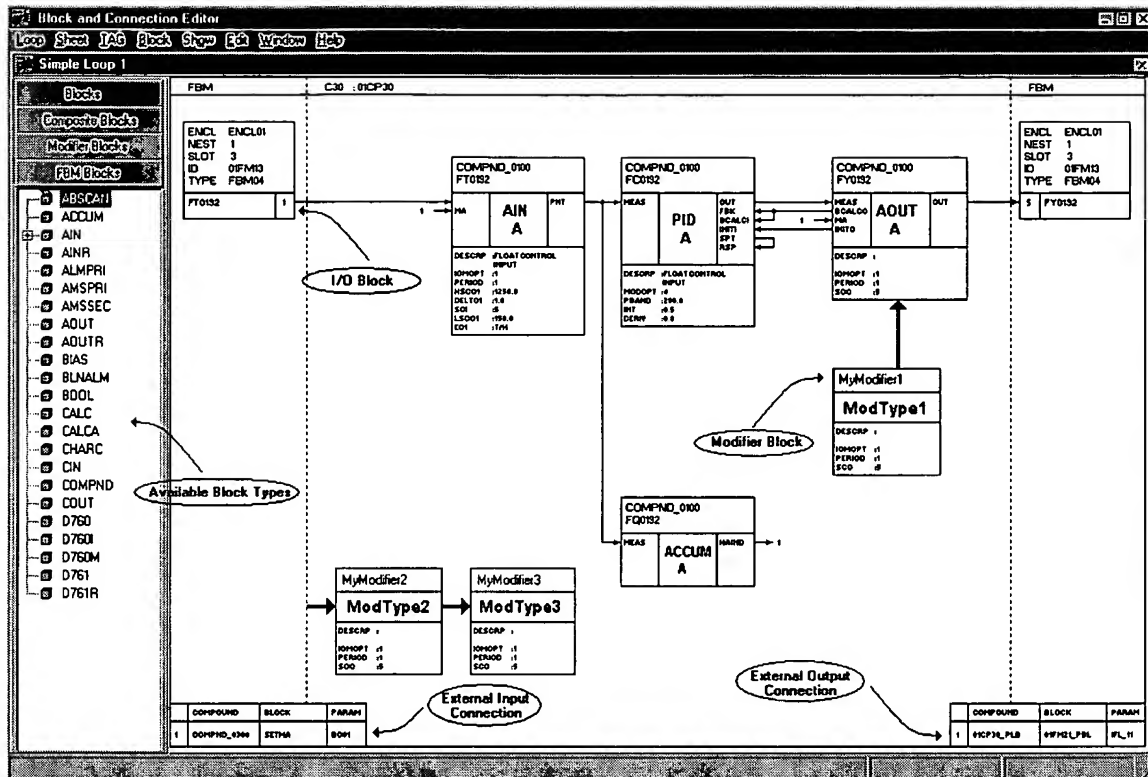


Figure 71 - Simple Loop

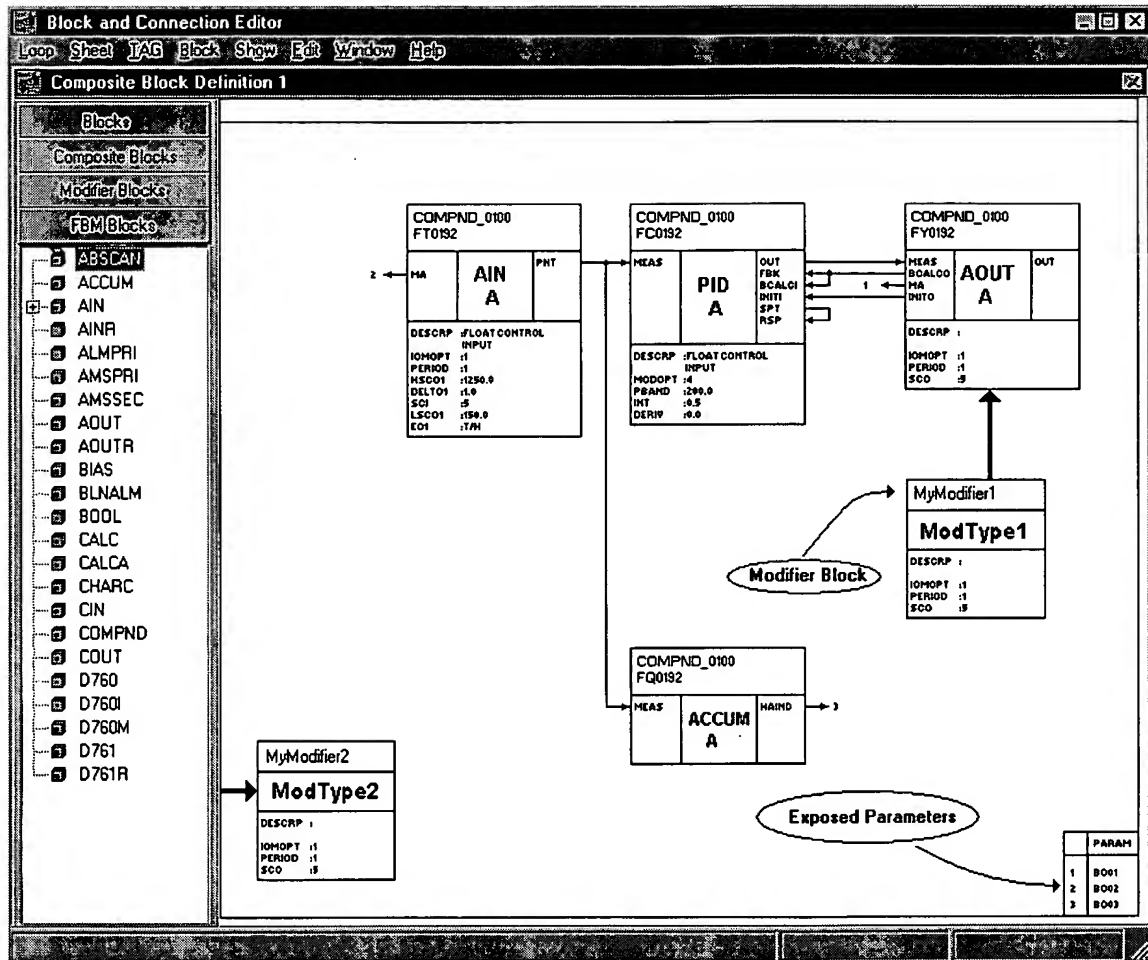


Figure 72 - Composite Block Definition

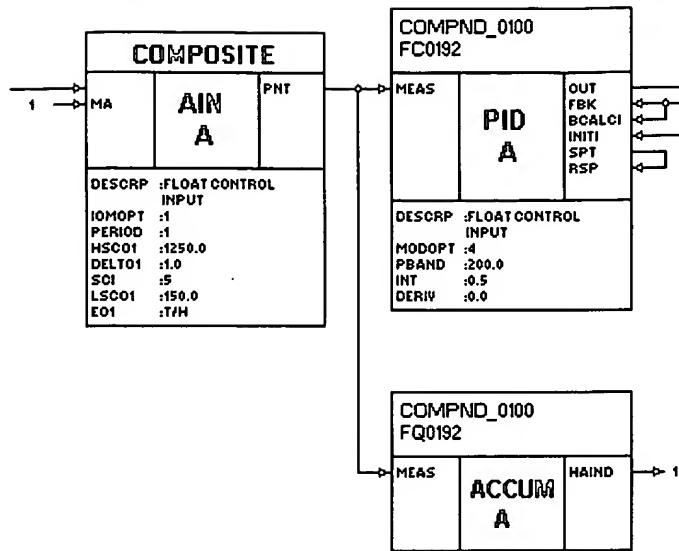


Figure 73 - Composite Block In Loop

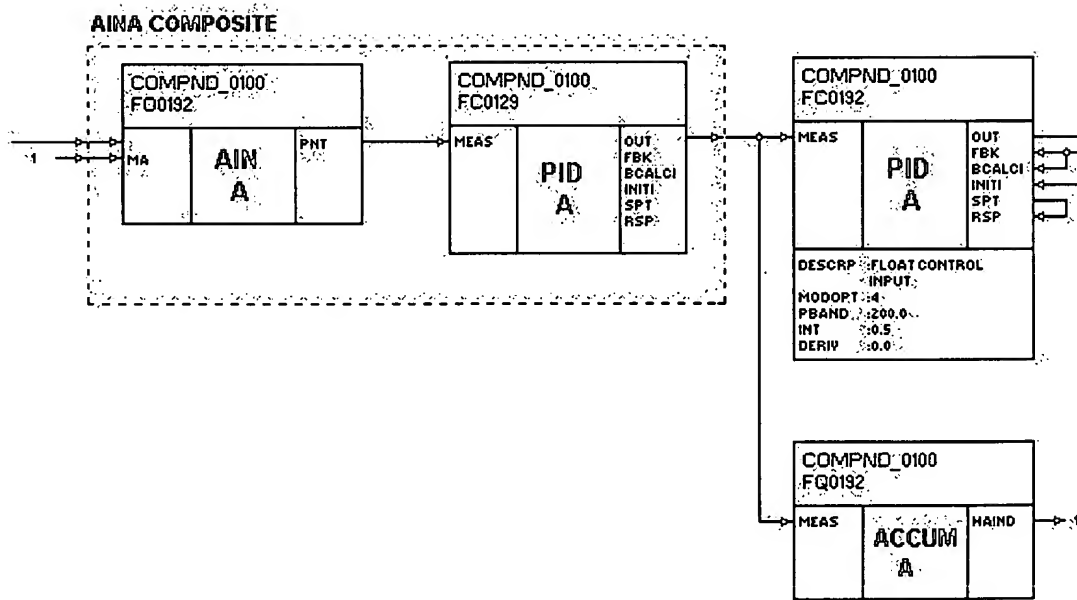


Figure 74 - Expanded Composite Block In Loop

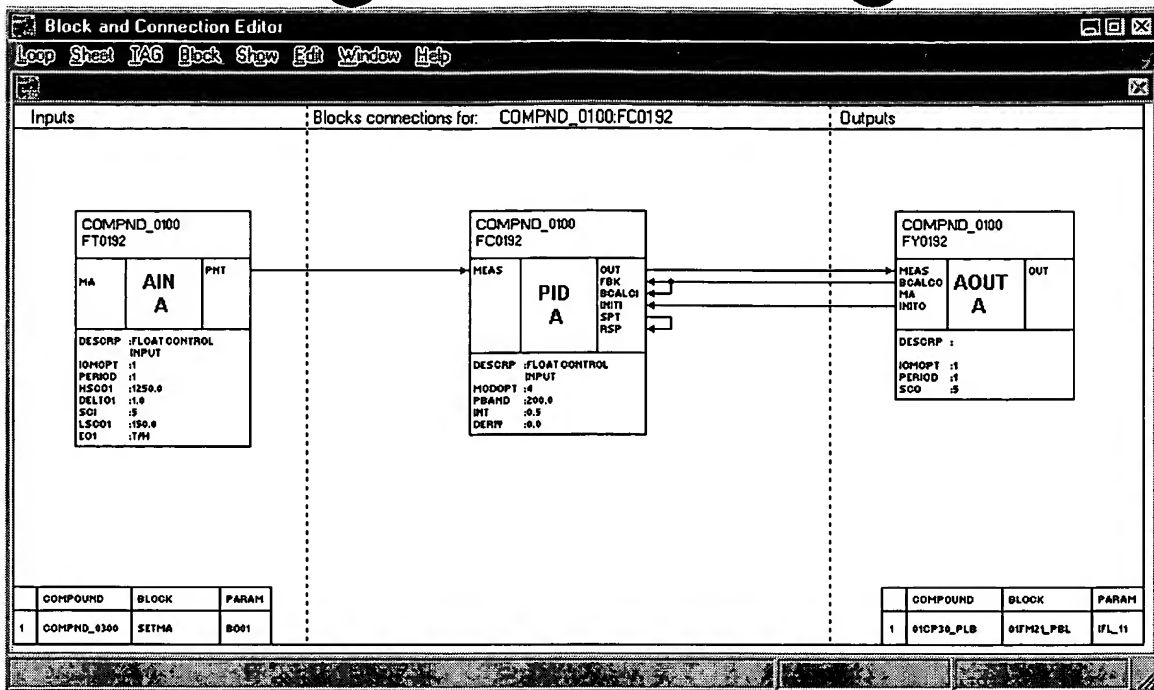


Figure 75 - Block with Connections

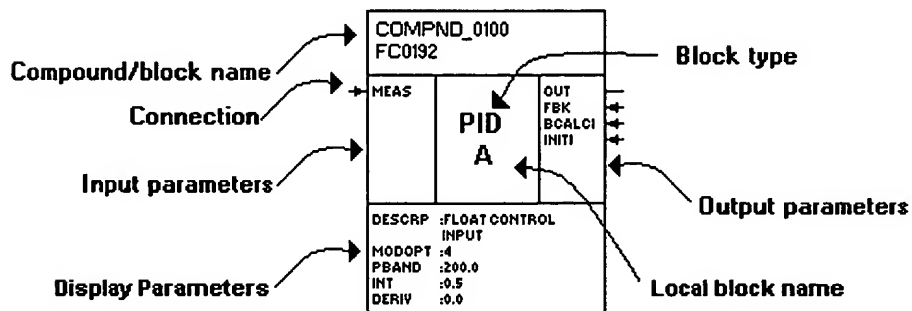


Figure 76 - Anatomy of a Block Placeholder



**Block Connections**

Compound: **COMPND\_0100**  
 Blockname: **01FM16 MCIN**

CINMSK: **MCIN**

CIN	Compound	Blockname	Type	Param
CIN_1	COMPND_0100	LV0188	ULU	OPNLIM
CIN_2	-	-	-	CLSLIM
CIN_20	-	-	-	AUTSW
CIN_3	-	LM0189	MTR	MSTAT
CIN_4	-	CV0177	ULU	OPNLIM
CIN_5	-	-	-	CLSLIM

← Delete Add

Param: **CIN\_1**

☒ Connect To:  
☐ Expose As:

CP	Compound	Blockname	Type	Param
01CP30	COMPND_0100	LV0188	ULU	OPNLIM

Figure 77 - Block Connection dialog

Param: **CIN\_1**

☒ Connect To:  
☐ Expose As:

Blockname	Type	Param
LV0188	ULU	OPNLIM

Figure 78 - Template/Definition Internal Connections

Param  
CIN\_1

☐ Connect To:

☒ Expose As:  
CIN\_1

Figure 79 - Template/Definition Exposed Connections

MYAIN

Reals

PNT	0.000000
RAWC	0.000000
HSC01	100.000000
LSC01	0.000000
DELTO1	1.000000
OSV	2.000000
MTRF	1.000000
FTIM	0.000000
XREFIN	0.000000
KSCALE	1.000000
BSCALE	0.000000
HAL	100.000000
LAL	0.000000
HLDB	0.000000
HHALIM	100.000000
LLALIM	0.000000
MEAS	0.000000

Value:  $f(x)$  my.LSC01 + 100.0

OK Cancel Apply Help

Figure 80 - Parameter Property Sheet

EK044200779US

MYAIN

Parameters for block: BLOCK2

Reals

PNT0.00000

RAWC0.00000

HSC01100.000000

LSC010.000000

DEL T011.000000

OSV2.000000

MTRF1.000000

FTIM0.000000

XREFIN0.000000

KSCALE1.000000

BSCALE0.000000

HAL100.000000

LAL0.000000

HLDB0.000000

HHALIM100.000000

LLALIM0.000000

MEAS0.000000

COMPBLOCK1

BLOCK1

BLOCK2

COMPBLOCK2

BLOCK3

BLOCK4

Value:  $f(x)$  my.LSC01 + 100.0

OK

Cancel

Apply

Help

Figure 81 - Composite Block Property Sheet

Value:  $f(x) = \text{LSC01} + 100.0$

Objects:	Parameters:	Functions:
Block	DELT01	SetDelta()
Compound	HAL	SetName()
Loop	HHALIM	SetTag()
Source	HSC01	
Tag	KSCALE	
	LAL	
	LLALIM	
	LSC01	
	MEAS	
	PNT	

Figure 82 - Parameter Formula Builder

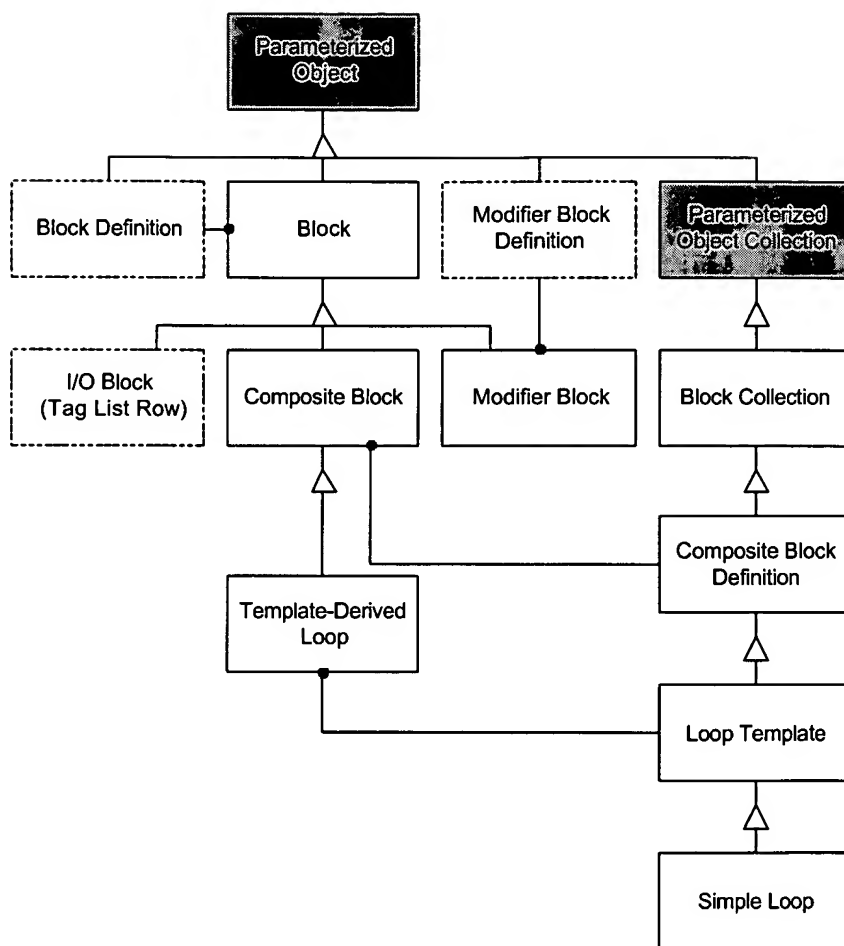


Figure 83 - Control Object derivations

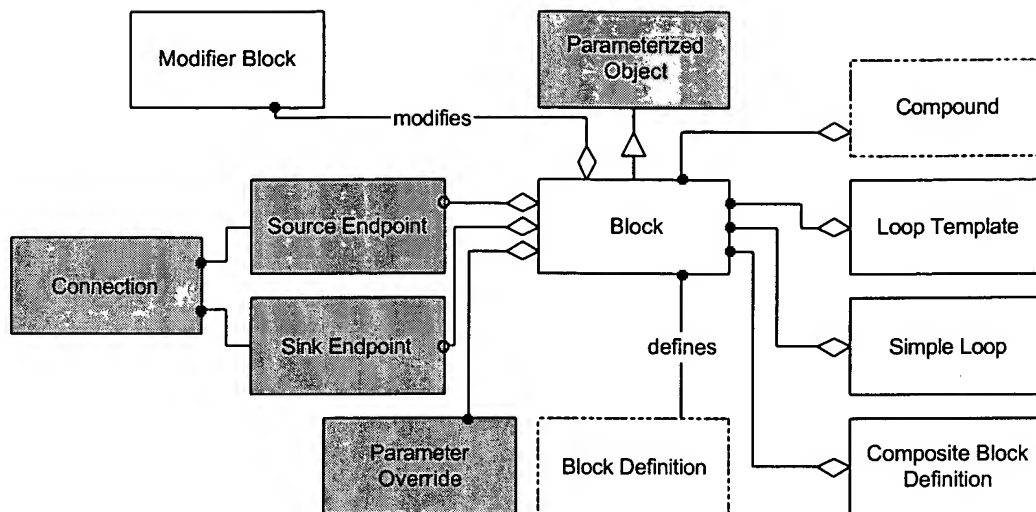


Figure 84 - Block object model

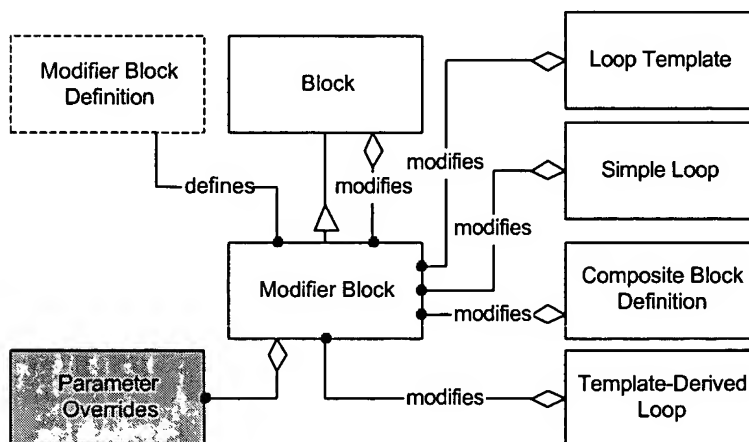


Figure 85 - Modifier Block object model

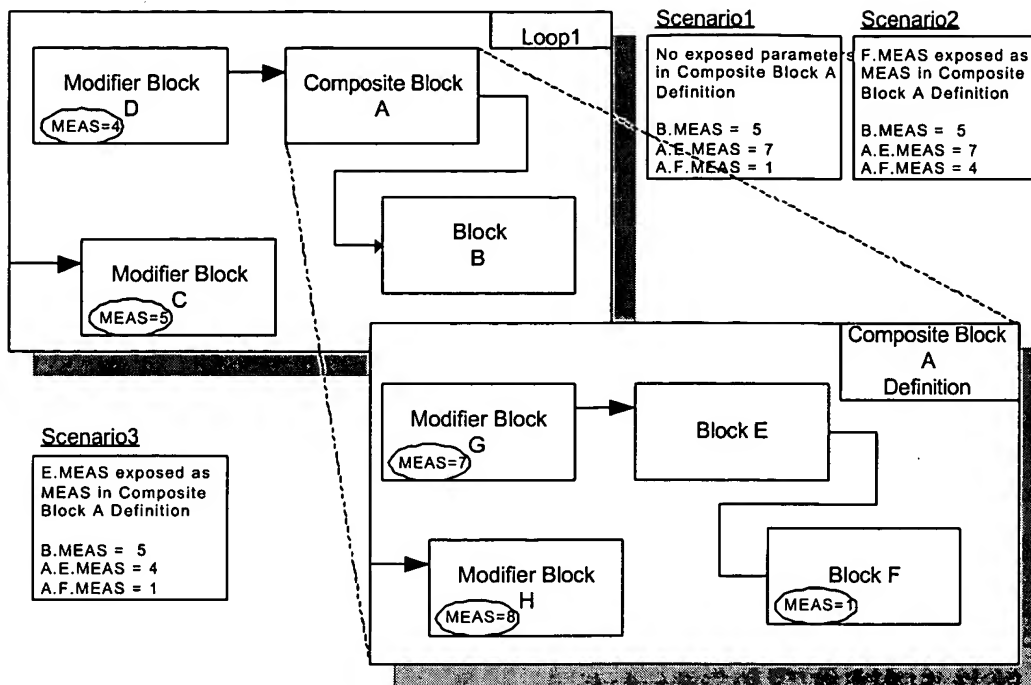


Figure 86 - Modifier Block Parameter override precedence

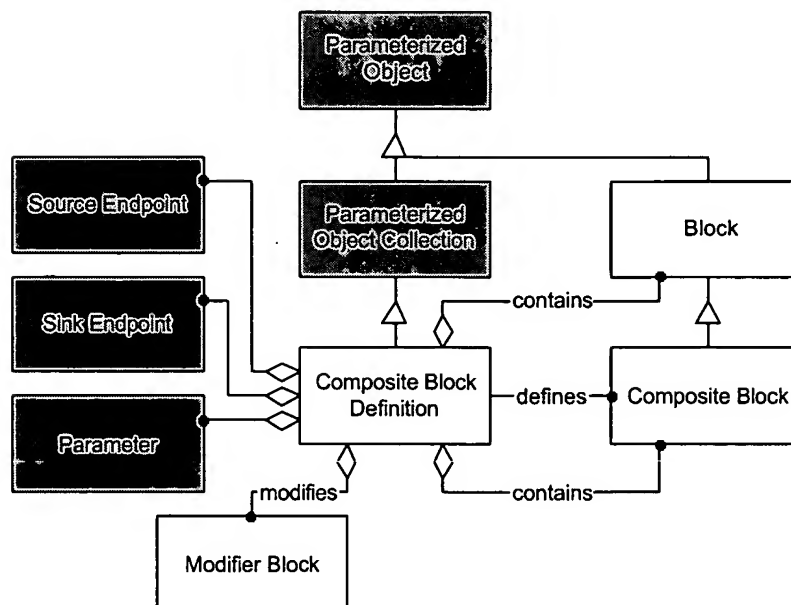


Figure 87 - Composite Block Definition object model

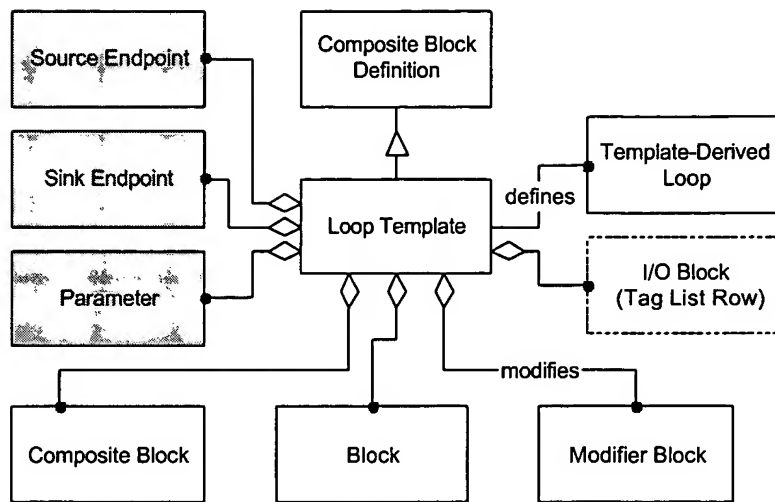


Figure 88 - Loop Template object model

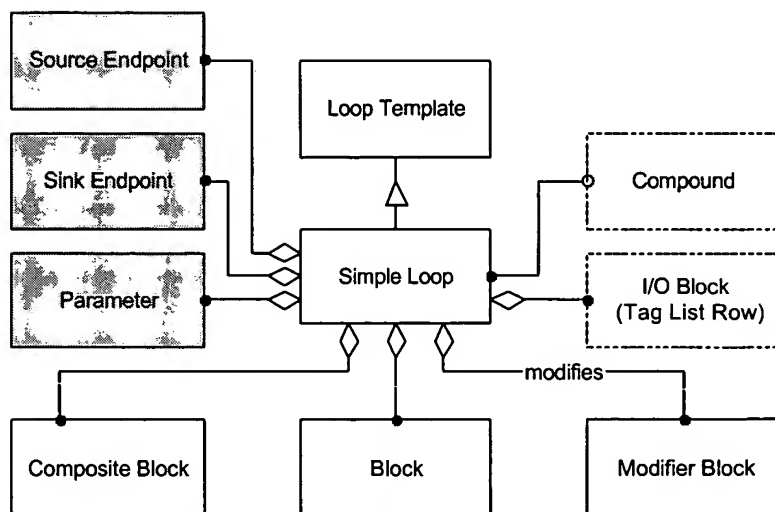


Figure 89 - Simple Loop object model



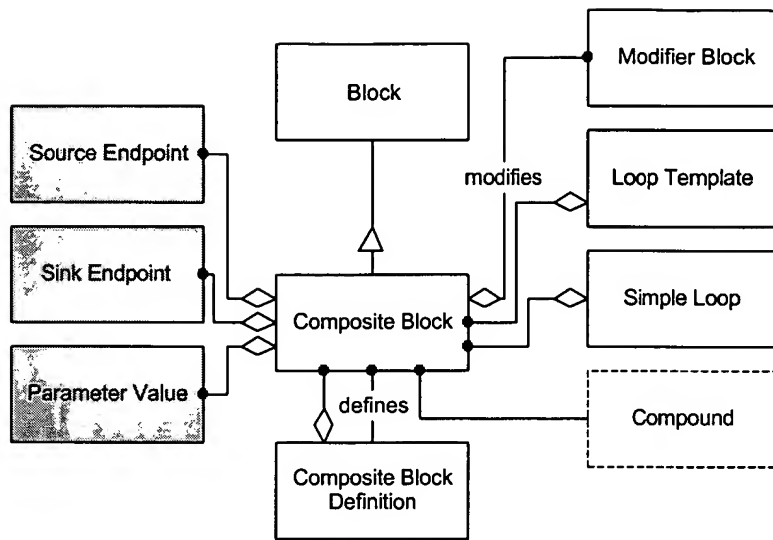


Figure 90 - Composite Block object model

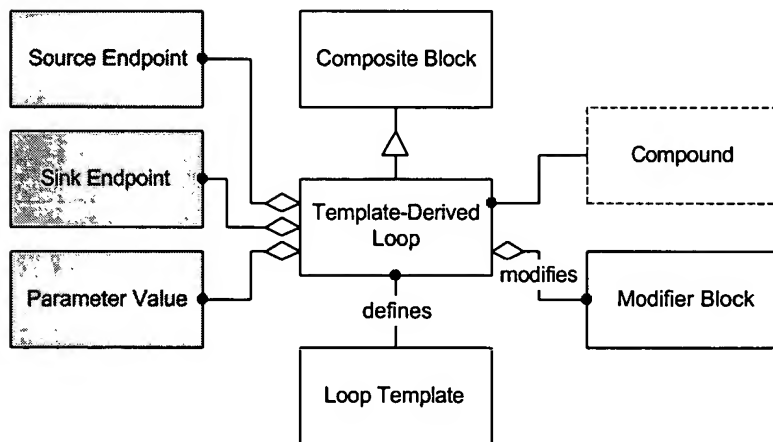


Figure 91 - Template-Derived Loop object model

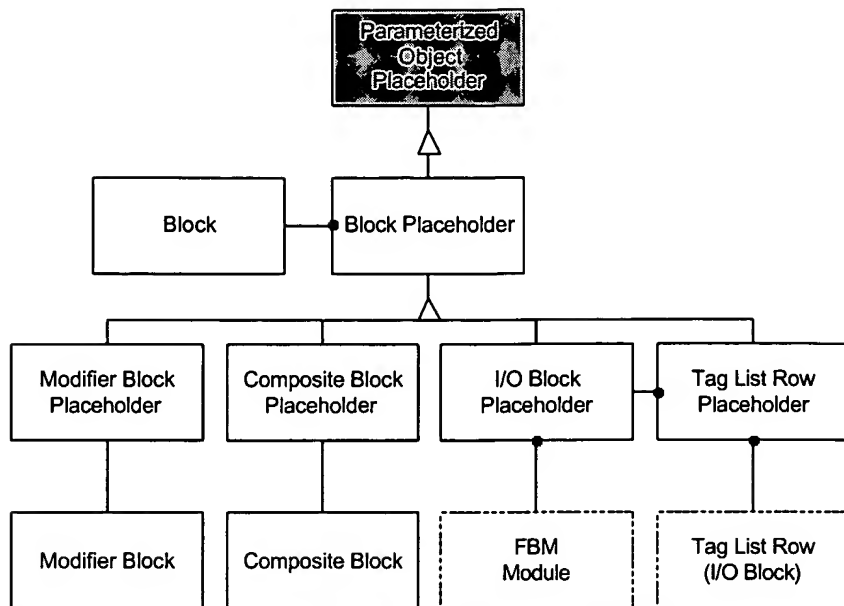


Figure 92 - Object Placeholder derivations

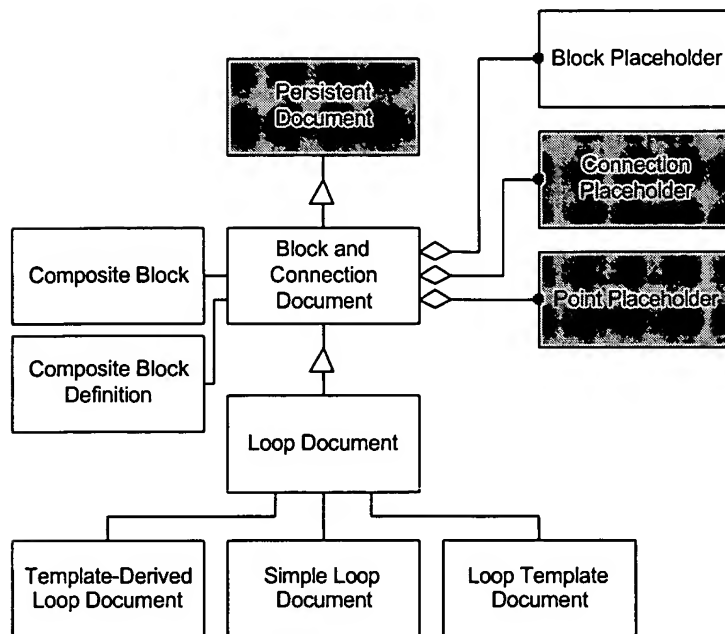


Figure 93 - Persistent Document Object derivations

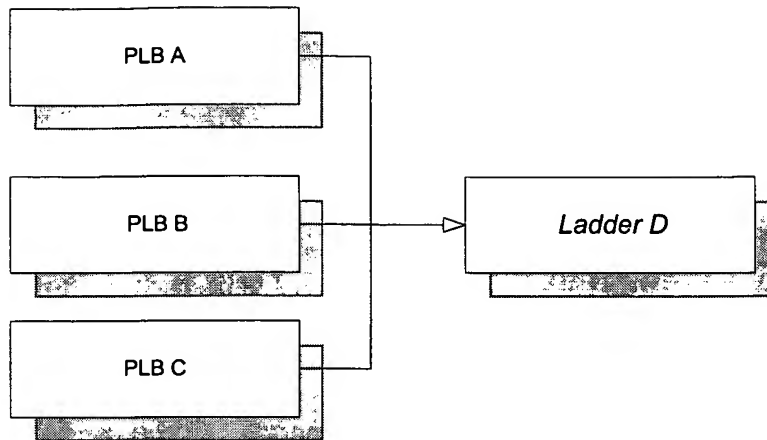


Figure 94 - PLB to Ladder Relationship

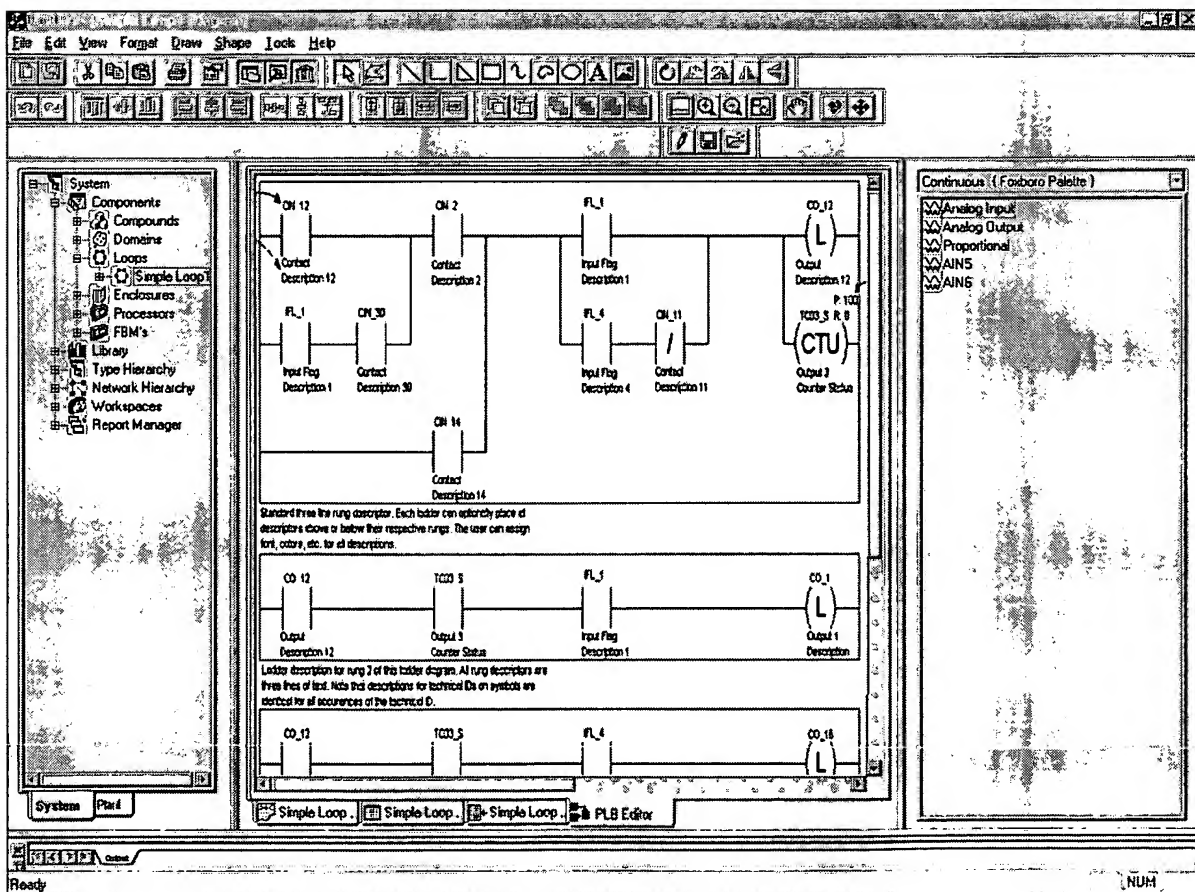


Figure 95 - Ladder Editor View

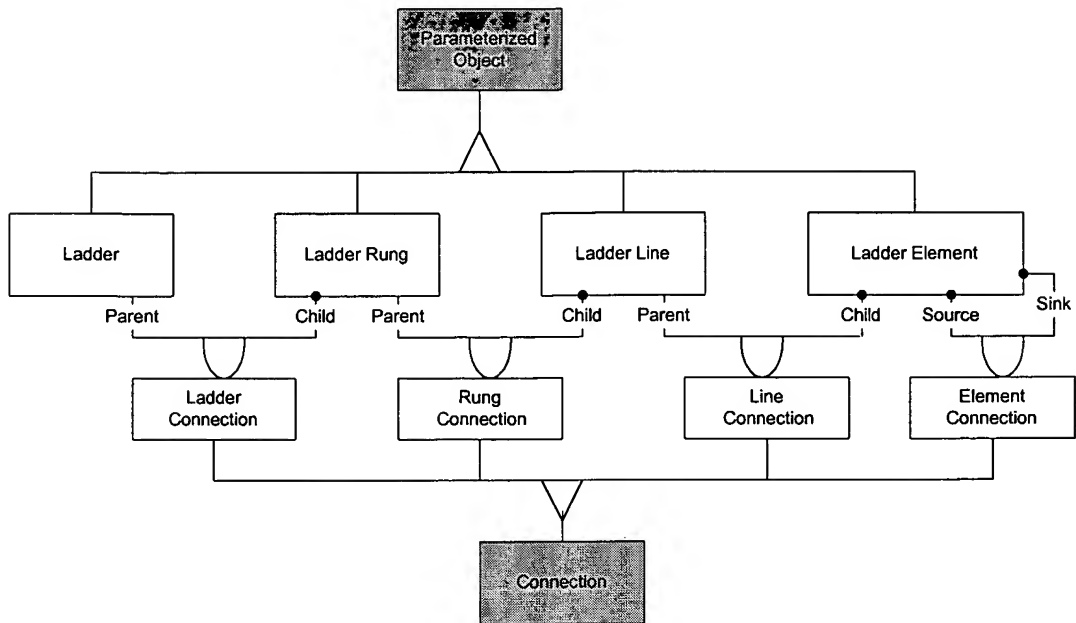


Figure 96 - Ladder Objects

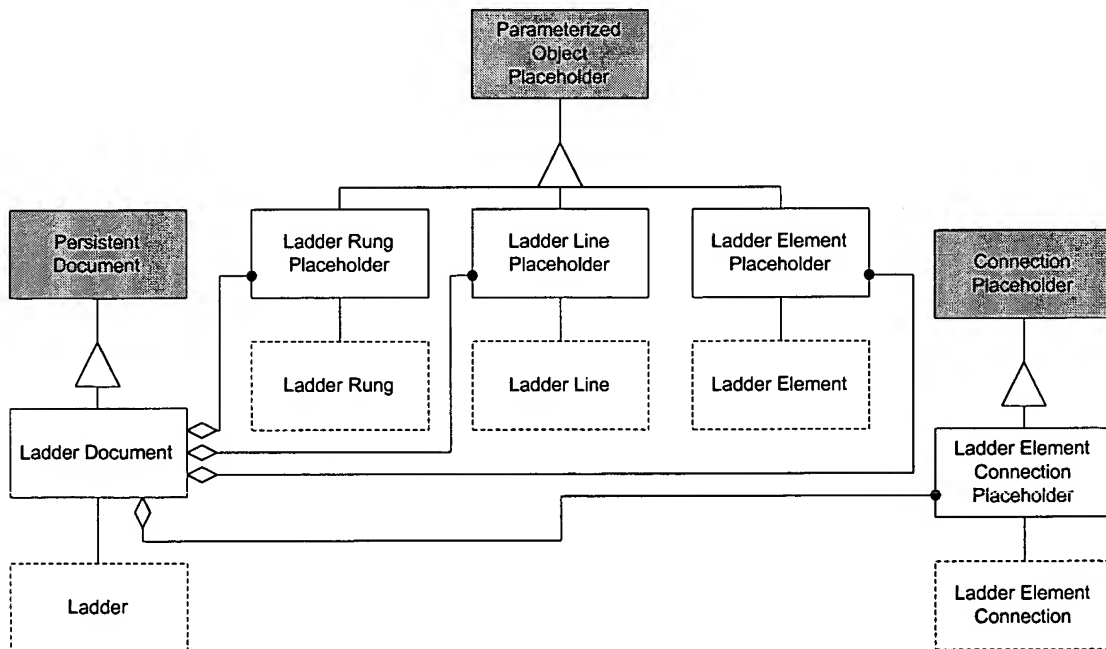


Figure 97 - Persistent Document Objects.

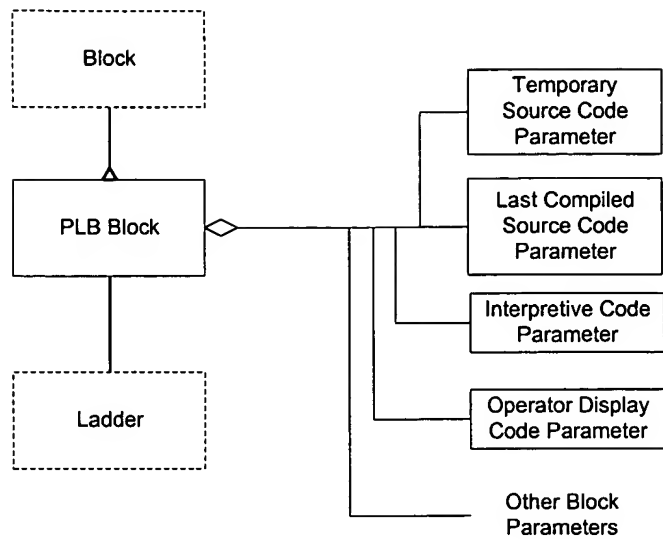


Figure 98 - PLB Block Model

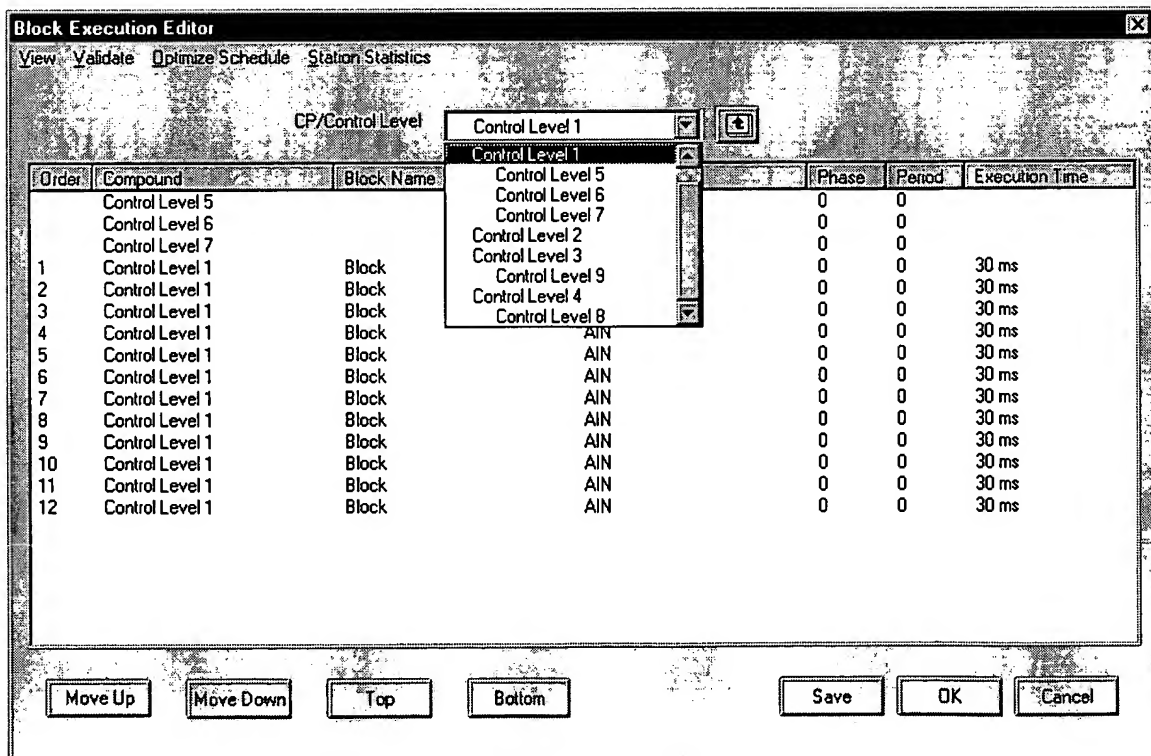


Figure 99 - Block Execution Scheduler Editor

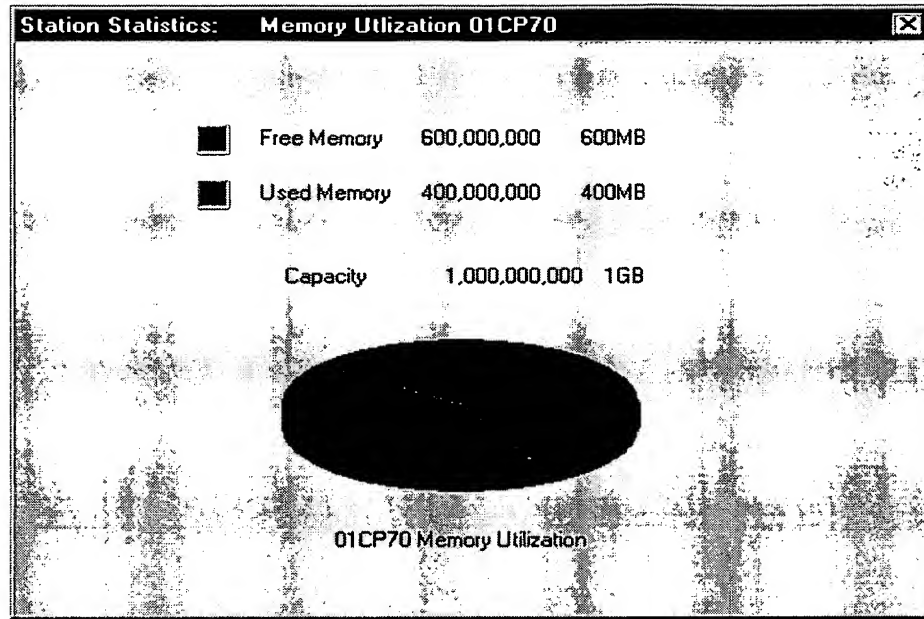


Figure 100 Station Statistics Dialog

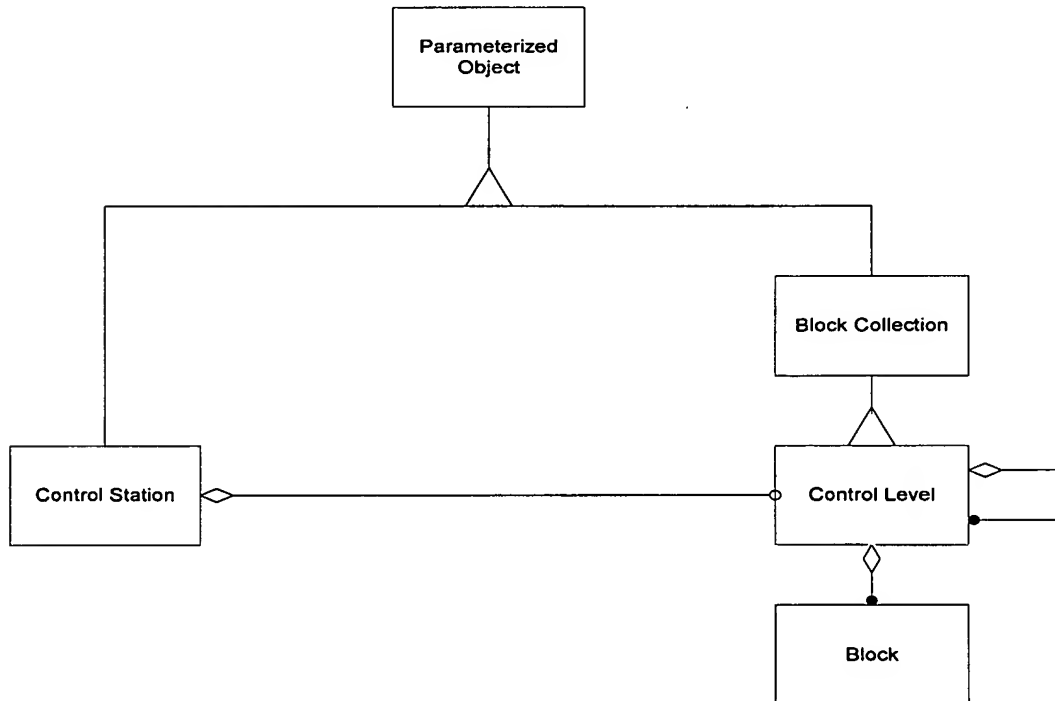


Figure 101 - Block Execution Editor Object Model

TAG List									
Compnd	Tag	L_tag	Descrp1	Descrp2	Type	Comp	Param	lom_id	lomide
01CP30_PLB	GV0144	GV0144	CONTACT INPUT		PLB	A1	CIN_8	01FM21	
01CP30_PLB	X0120A	X0120	INPUT 1 TO LADDER	LOGIC	PLB	A1	CIN_4	01FM21	
01CP30_PLB	X0120B	X0120	INPUT 2 TO LADDER	LOGIC	PLB	A2	CIN_5	01FM21	
01CP30_PLB	X0120C	X0120	INPUT 3 TO LADDER	LOGIC	PLB	A3	CIN_6	01FM21	
01CP30_PLB	X0120D	X0120	INPUT 4 TO LADDER	LOGIC	PLB	A4	CIN_7	01FM21	
01CP30_PLB	X0120E	X0120	OUTPUT 1 F. LADDER	LOGIC	PLB	A5	CO_9	01FM21	01FM22
01CP30_PLB	X0120F	X0120	OUTPUT 2 F. LADDER	LOGIC	PLB	A6	CO_10	01FM21	01FM22
01CP30_PLB	X0120G	X0120	OUTPUT 3 F. LADDER	LOGIC	PLB	A7	CO_11	01FM21	01FM22
01CP30_PLB	X0120H	X0120	OUTPUT 3 F. LADDER	LOGIC	PLB	A8	CO_12	01FM21	01FM22
02CP30_PLB	HV0210CLOSE	HV0210	VALVE DEVICE LIMIT	CLOSE	PLB	A2	CIN_2	02FM15	
02CP30_PLB	HV0210OC	HV0210	VALVE OPEN CLOSE	SWTCH	PLB	A3	CO_9	02FM15	02FM16
02CP30_PLB	HV0210OPEN	HV0210	VALVE DEVICE LIMIT	OPEN	PLB	A1	CIN_1	02FM15	
2022NAPHTHA	F0215	F0215			AIN	A	PNT	11FM11	
2022NAPHTHA	F0215V	F0215			AOUT	A	OUT	11FM11	
2022NAPHTHA	F0216	F0215			AIN	B	PNT	11FM11	
2022NAPHTHA	F0216V	F0215			AOUT	B	OUT	11FM11	
2022NAPHTHA	F0217	F0215			AIN	C	PNT	11FM11	
2022NAPHTHA	F0217V	F0215			AOUT	C	OUT	11FM11	
2022NAPHTHA	F0218	F0215			AIN	D	PNT	11FM11	
2022NAPHTHA	F0218V	F0215			AOUT	D	OUT	11FM11	
COMPND_0100	F0120	F0120	FLOAT MEASUREMENT	INPUT 1	AIN	A	PNT	01FM14	
COMPND_0100	F0130	F0120	FLOAT MEASUREMENT	INPUT 2	AIN	B	PNT	01FM14	
COMPND_0100	FT0100	F0100	FLOAT	INDICATION	AIN	A	PNT	01FM11	
COMPND_0100	FT0101	F0101	FLOAT	INDICATION	AIN	A	PNT	01FM11	

Figure 102 - Tag List Data Entry Screen

Field	Contents	#	Table.Field	Type	Width	Dec
Field1	"01CP30_PLB"	1	TAGLIST.COMPND	C	12	0
Field2	"GV0144"	2	TAGLIST.TAG	C	18	0
Field3	"GV0144"	3	TAGLIST.L_TAG	C	24	0
Field4	"CONTACT INPUT"	4	TAGLIST.DESCRP1	C	18	0
Field5	""	5	TAGLIST.DESCRP2	C	14	0
Field6	"PLB"	6	TAGLIST.TYPE	C	8	0
Field7	"A1"	7	TAGLIST.COMP	C	4	0
Field8	"CIN_8"	8	TAGLIST.PARAM	C	10	0
Field9	"01FM21"	9	TAGLIST.IOM_ID	C	6	0
Field10	""	10	TAGLIST.IOMIDE	C	6	0
Field11	""	11	TAGLIST.IOMIDR	C	6	0

Source      # Target

Start

Save

Cancel

Figure 103 - Tag List Import from ASCII File

**TAG Export - Field Mapping**

Field	Contents	#	Table.Field	Type	Width	Dec
Field1		1	TAGLIST.COMPND	C	12	0
Field2		2	TAGLIST.TAG	C	18	0
Field3		3	TAGLIST.L_TAG	C	24	0
Field4		4	TAGLIST.DESCRP1	C	18	0
Field5		5	TAGLIST.DESCRP2	C	14	0
Field6		6	TAGLIST.TYPE	C	8	0
Field7		7	TAGLIST.COMP	C	4	0
Field8		8	TAGLIST.PARAM	C	10	0
Field9		9	TAGLIST.IOM_ID	C	6	0
Field10		10	TAGLIST.IOMIDE	C	6	0
Field11		11	TAGLIST.IOMIDR	C	6	0

↓ ↑

Target	#	Source
Field1	< 1	TAGLIST.COMPND
Field2	< 2	TAGLIST.TAG
Field3	< 3	TAGLIST.L_TAG
Field4	< 4	TAGLIST.DESCRP1
Field5	< 5	TAGLIST.DESCRP2
Field6	< 6	TAGLIST.TYPE
Field7	< 7	TAGLIST.COMP
Field8	< 8	TAGLIST.PARAM
Field9	< 9	TAGLIST.IOM_ID
Field10	< 10	TAGLIST.IOMIDE
Field11	< 11	TAGLIST.IOMIDR

Show Export Save Cancel

Figure 104 - Tag List Export to ASCII File

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**Dataforms - Field Mapping**

#	Field	Type	Width	Dec
1	COMPND	C	12	0
2	TAG	C	18	0
3	L_TAG	C	24	0
4	DESCRP1	C	18	0
5	DESCRP2	C	14	0
6	TYPE	C	8	0
7	COMP	C	4	0
8	PARAM	C	10	0
9	IOM_ID	C	6	0
10	IOMIDE	C	6	0
11	IOMIDR	C	6	0

#	Field	Type	Width	Dec
1	DESCRP	C	32	0
2	PERIOD	C	12	0
3	PHASE	C	6	0
4	PLC_ID	C	32	0
5	RDADDR	C	32	0
6	BITLEN	C	6	0
7	PCINPS	C	6	0
8	SCNTYP	C	1	0
9	PLC2FL	C	1	0
10	RECSIZ	C	6	0
11	LASTGU	C	1	0

Target = Source  
IOM\_ID = PLC\_ID

Show Save Cancel

Figure 105 - Tag List Import / Export from Database Table

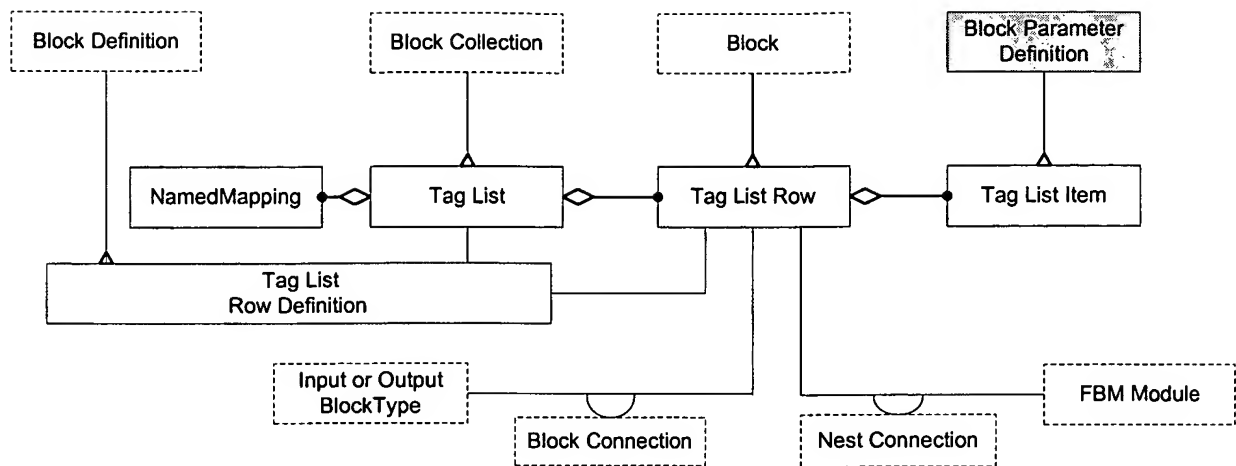


Figure 106 - Tag List Object Model

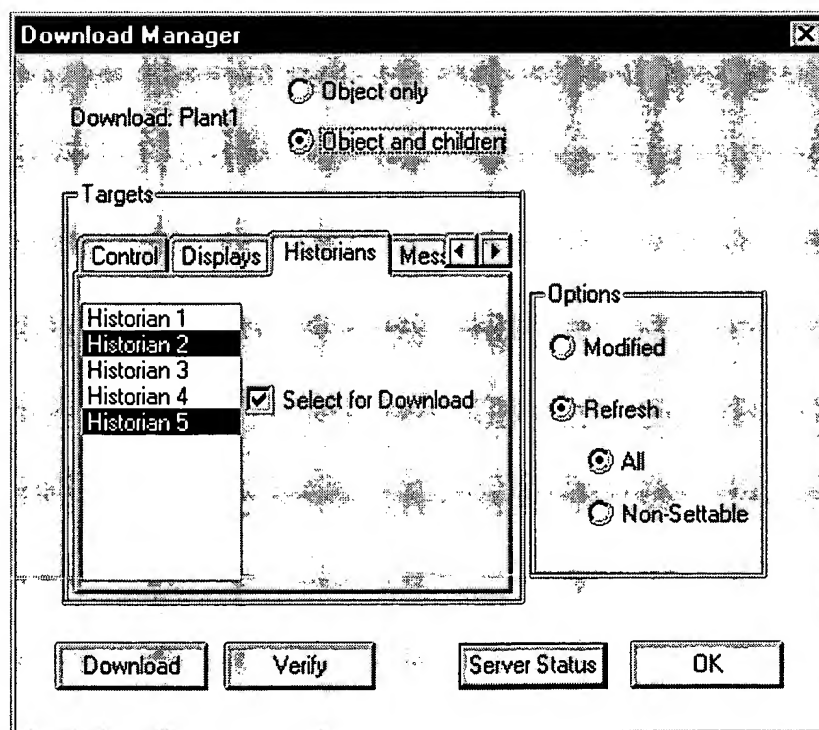


Figure 107 - Download Target Selection

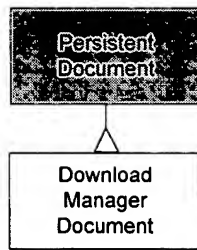


Figure 108 - Download Manager Document Object

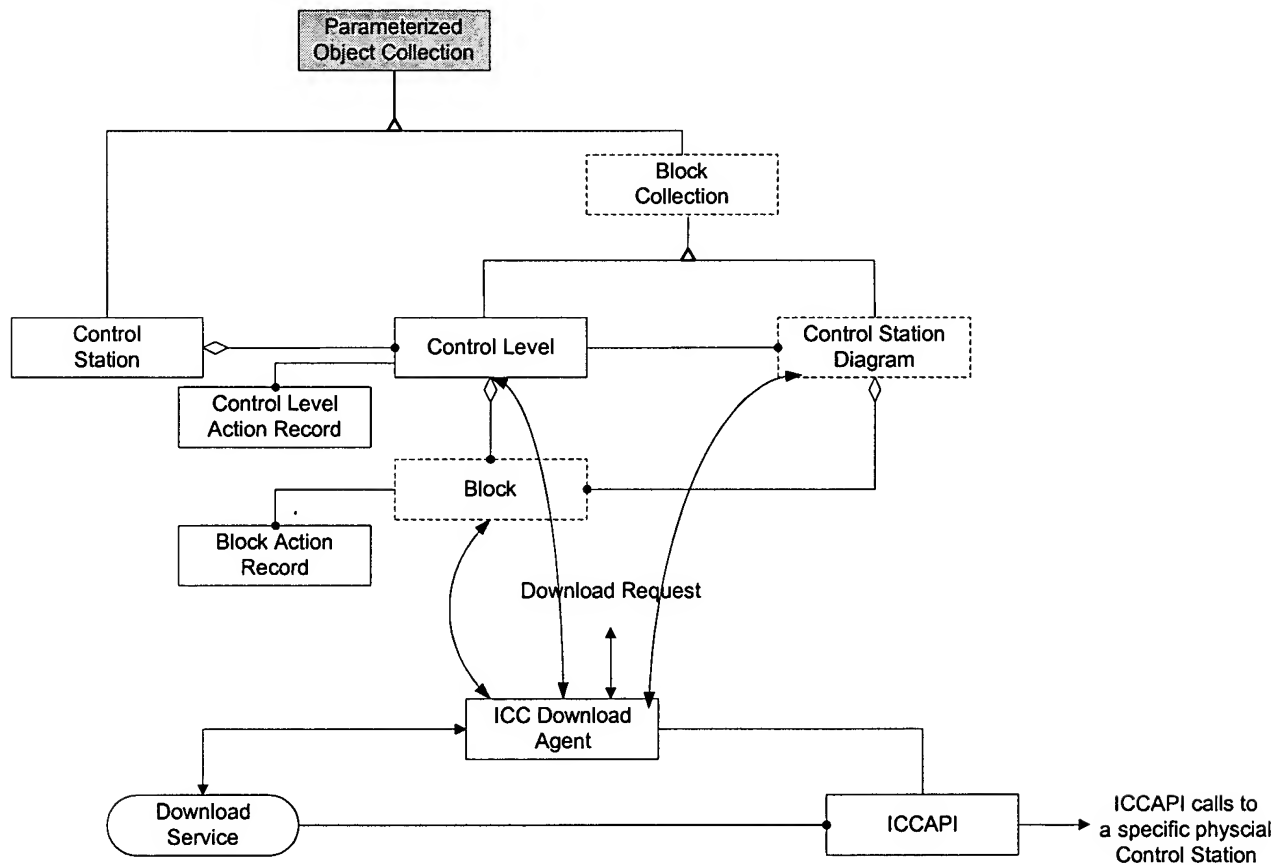


Figure 109 - Download Services Object Model

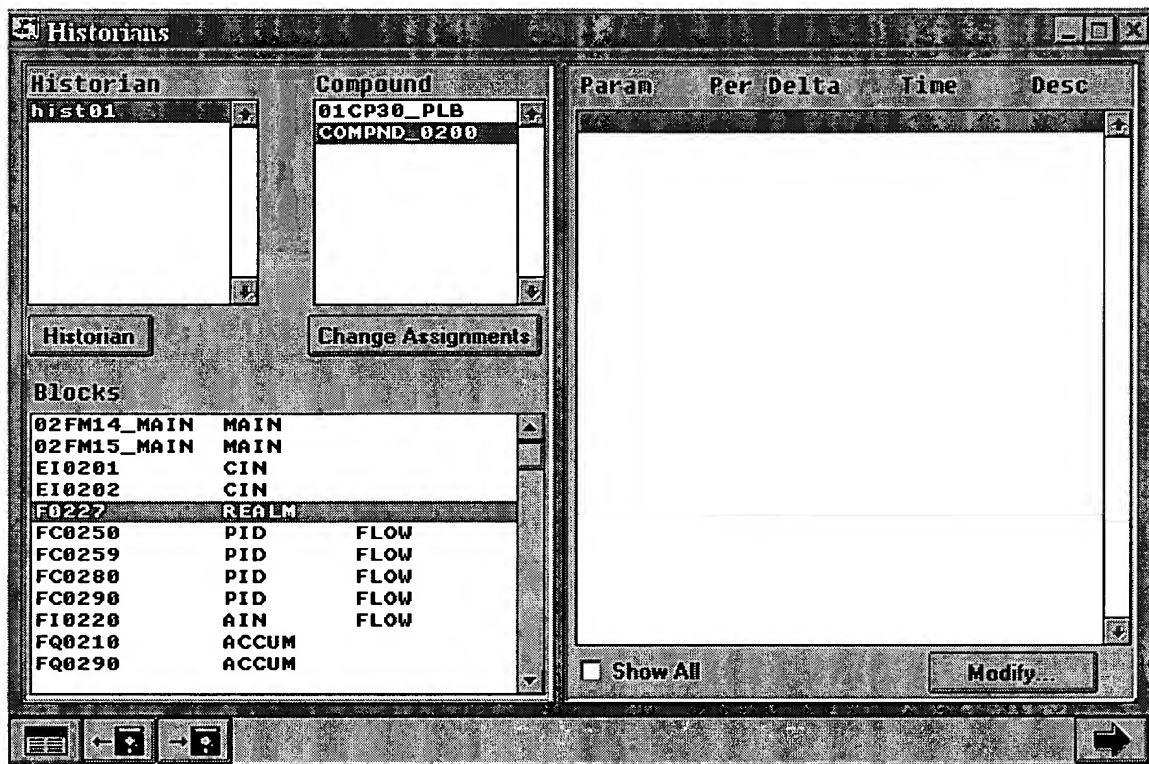


Figure 110 - Historian Assignment Overview

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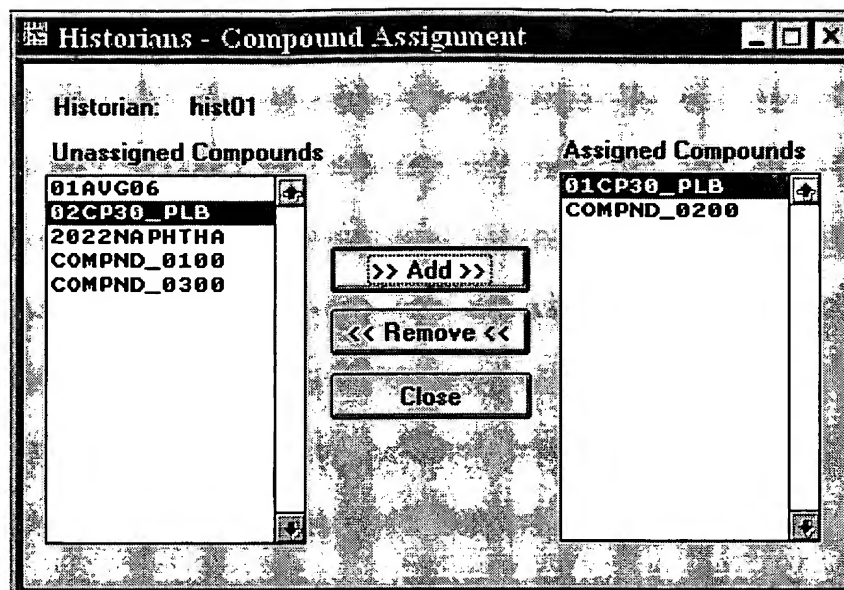


Figure 111 - Individual Compound Assignment

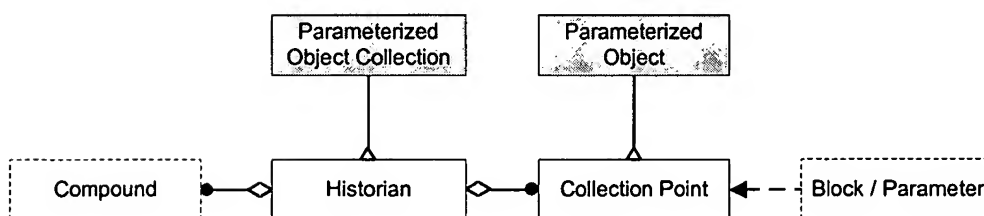


Figure 112 - Historian Object Model

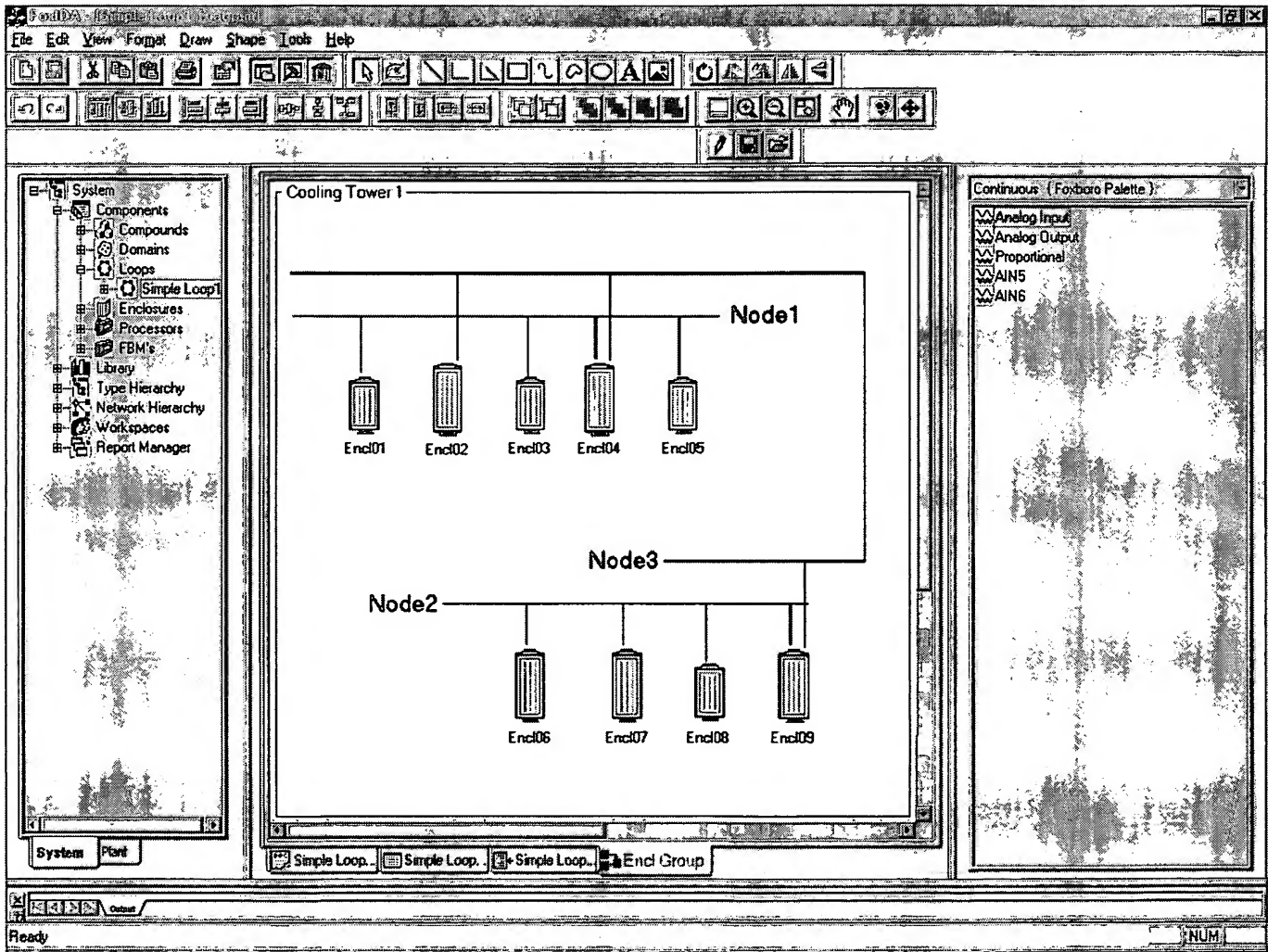


Figure 113 - Enclosure Group View

EK044200779US

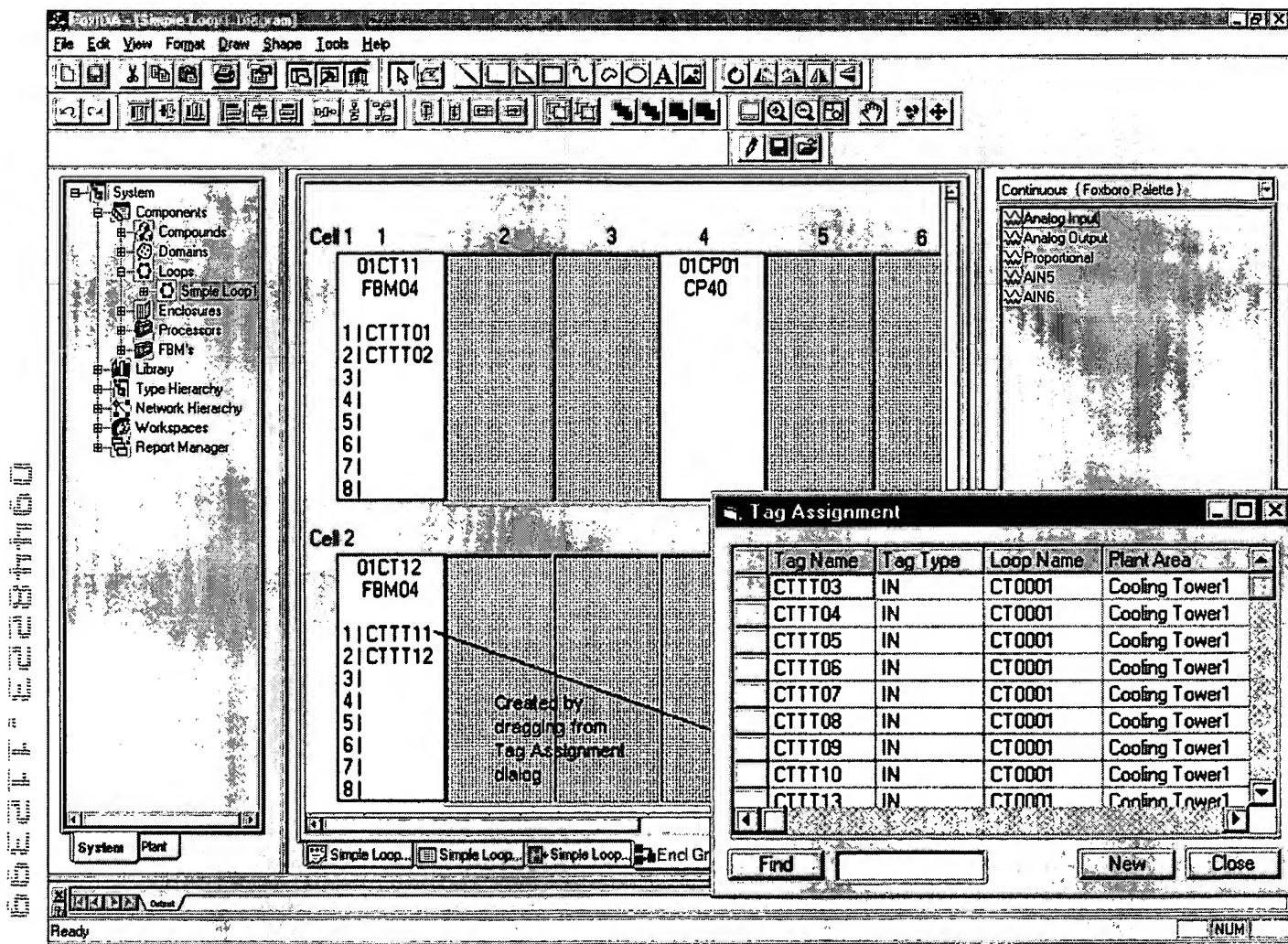


Figure 114 - Enclosure Loading View and Tag Assignment Dialog

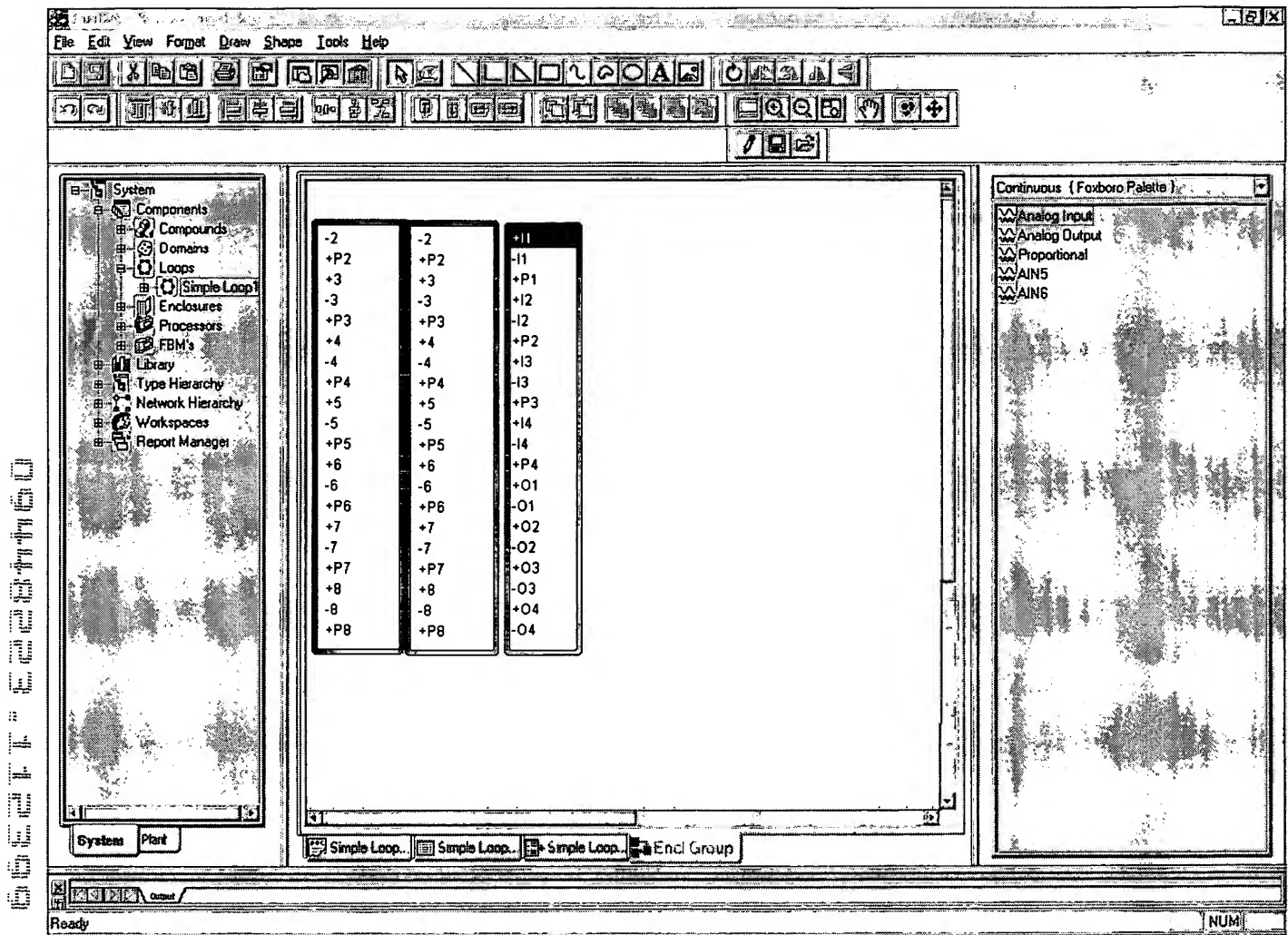


Figure 115 - Enclosure Input/Output Termination View



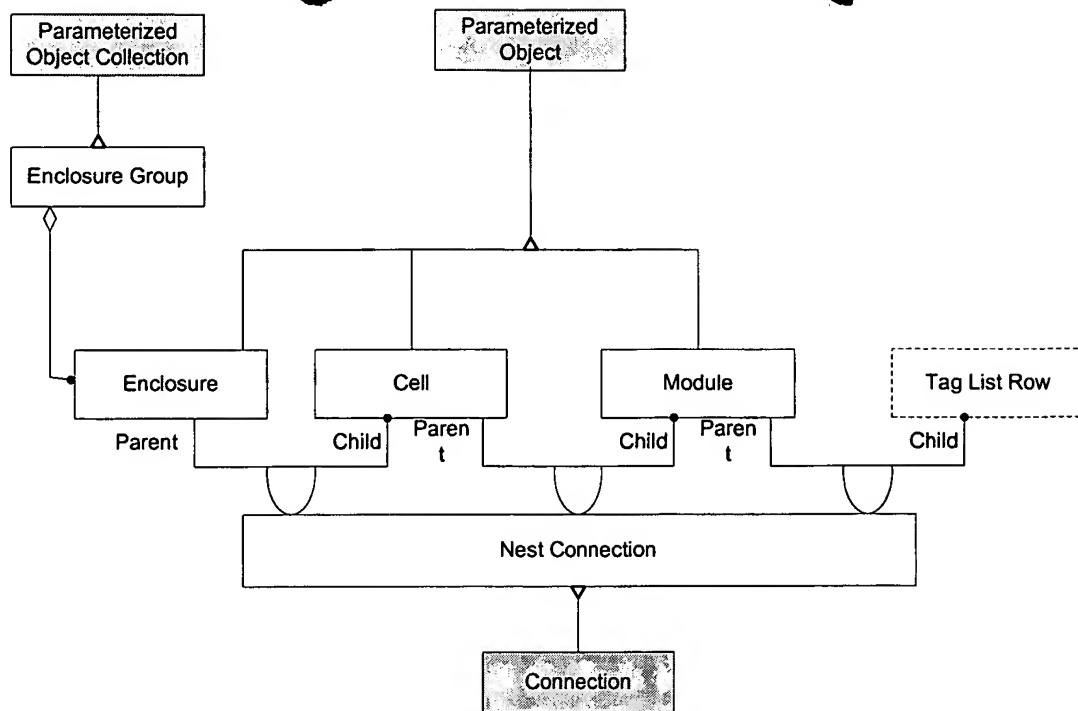


Figure 116 - Enclosure Loading Model

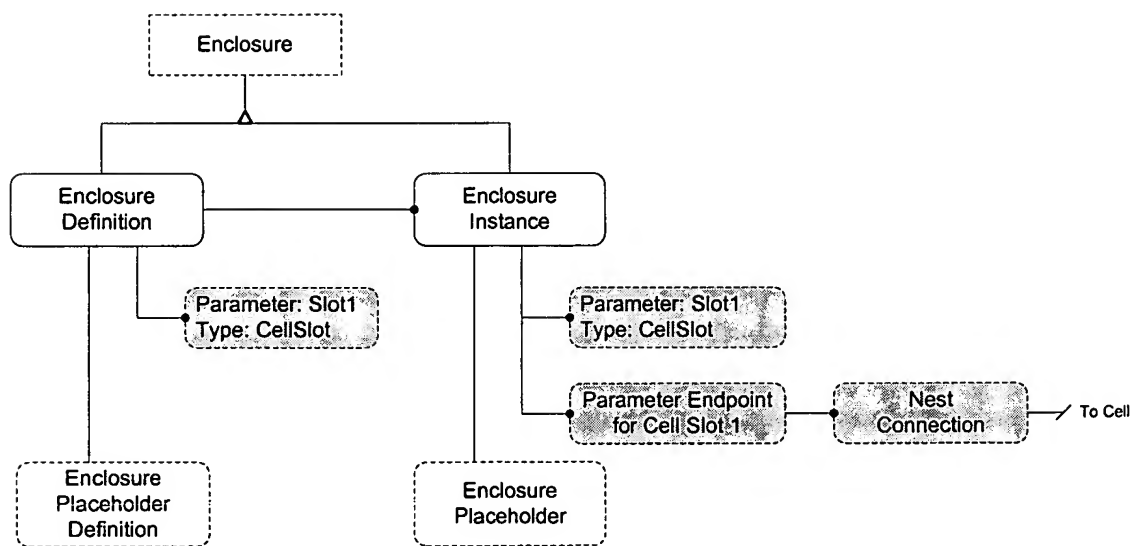


Figure 117 - Enclosure Definition Detail Model

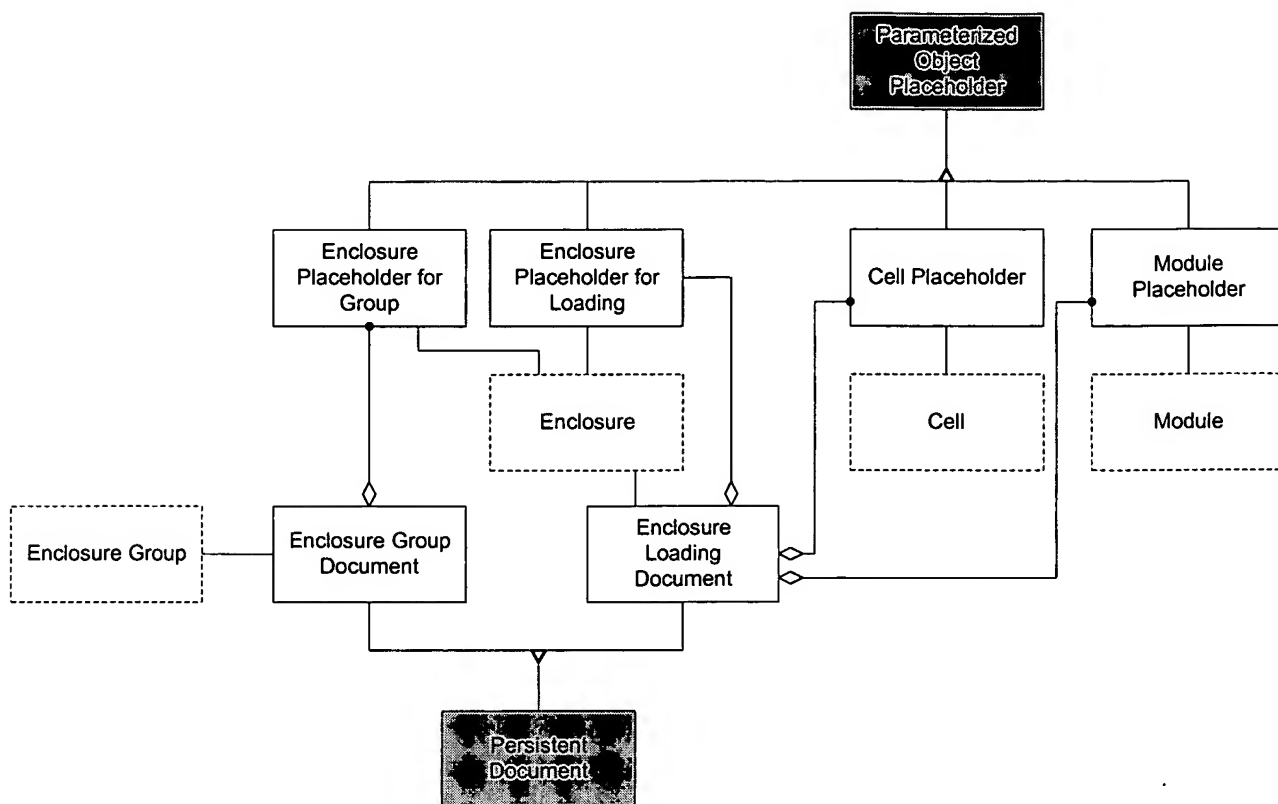


Figure 118 - Persistent Document Objects.

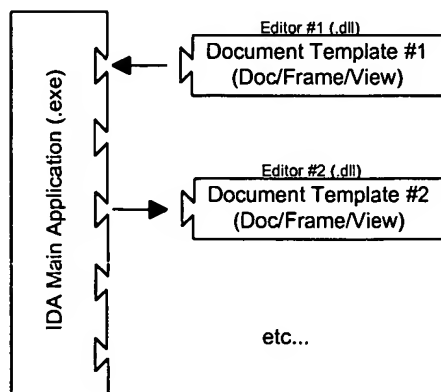


Figure 119 - IDA Main Application Architecture

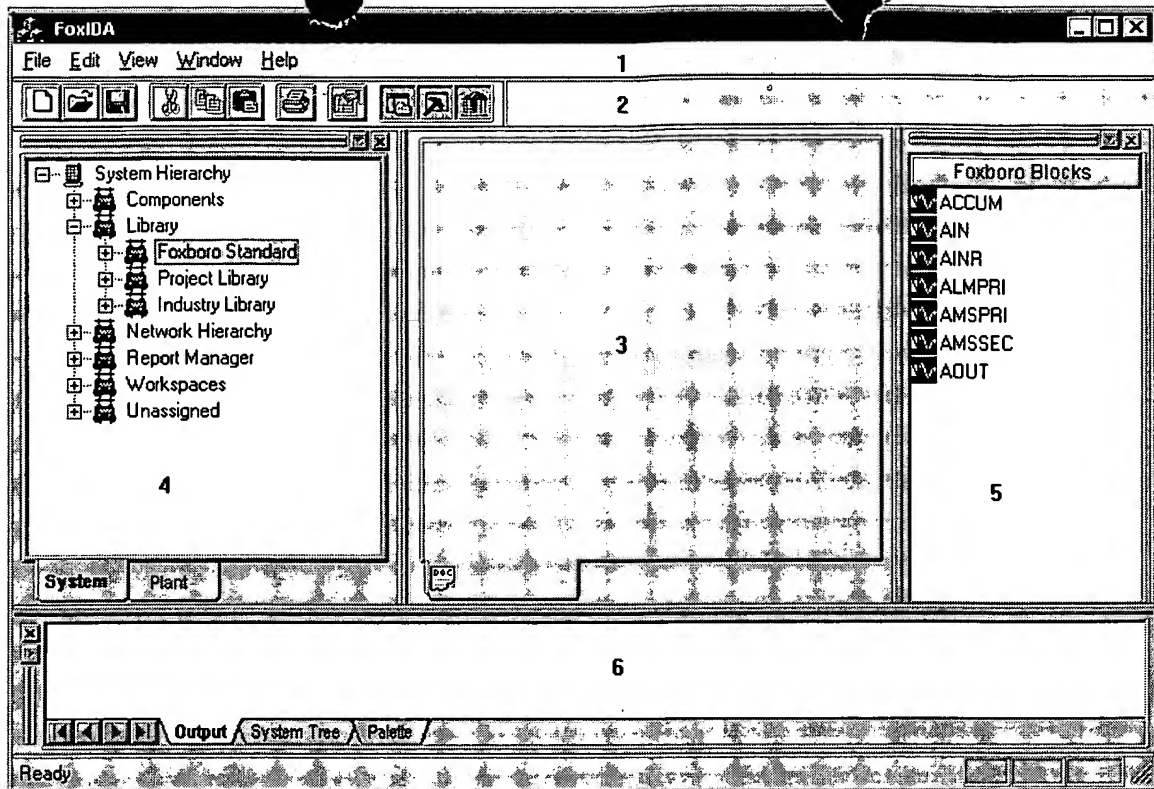


Figure 120 - Typical IDA Generic Editor Frame

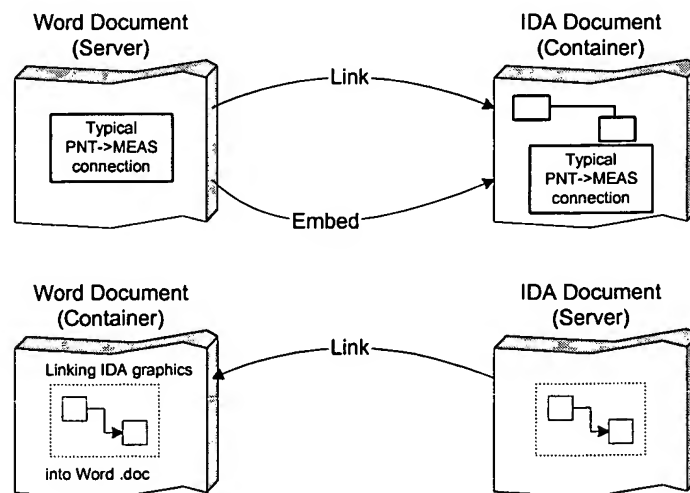


Figure 121 - IDA & OLE Compound Documents